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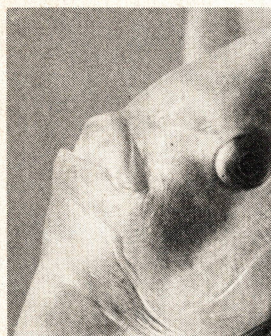
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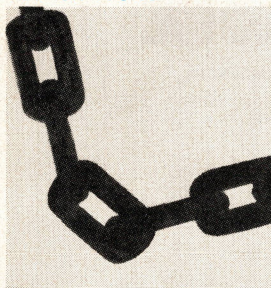


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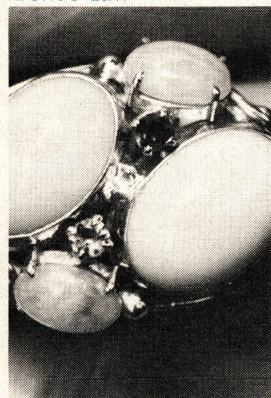
VOLUME TWENTY-FOUR NUMBER THREE



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26/It's Law



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STAFF PAUL TZIMOULIS *Publisher* / JACK McKENNEY *Editor* / CONNIE JOHNSON
Managing Editor / ARTHUR SMITH *Art Director* / SHERNA HOUGH *Associate Editor* / GAIL YAZIJIAN *Ad Production Artist*

COVER – This colorful little dragon is just one of many nudibranchs which live on "Big Bommey" in 25 feet of water at Heron Island, Australia, located at the southern end of the Great Barrier Reef. Jack McKenney photographed it with a Nikon in an Oceanic Products housing, Kodachrome 64, Vivitar strobe, 1/60 sec., at f 11.

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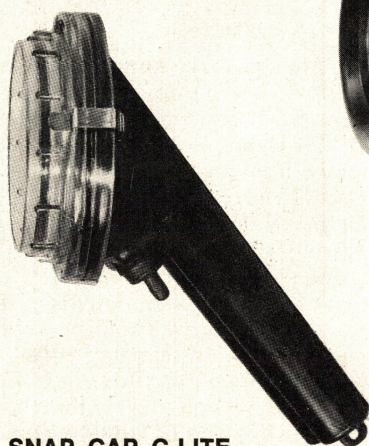


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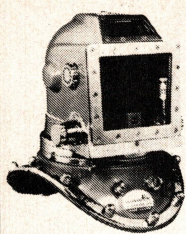
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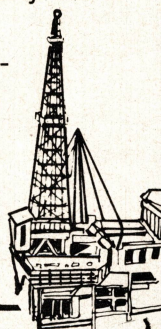
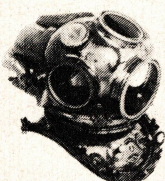


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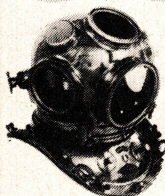
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... I was delighted to see the article "The Purple Striped Jellyfish" in the October 1974 SKIN DIVER. Pelagia is certainly one of our most colorful medusae but surprisingly little is known about its biology. In fact it was not even officially named until 1964 when Dr. F.S. Russell described it as a new species of jellyfish and named it *Pelagia colorata* due to its distinctive coloration. We do know that the genus pelagia is unusual in that it does not have a polyp stage or scyphistoma which lives attached to the bottom, instead pelagia has very large eggs which when fertilized transform directly into juvenile medusae.

Because divers probably observe jellyfish more often than do shipboard scientists they could make important observations on the biology of medusae. I am making a study of the larger jellyfish and I would appreciate divers sending me their observations. Important data is when and where medusae are seen, diameter of umbrella length of tentacles and frilled arms, occurrence of associated organisms, food etc. Please include a description of the medusa including color and if possible a slide, picture or drawing. Medusae are generally easy to preserve by placing small specimens or one half of larger specimens in 10% formalin solution.

RON J. LARSON DEPT. OF MARINE SCIENCE,
UNIV. OF PUERTO RICO
MAYAGUEZ, P.R. 00708

... After several "stinging" experiences while diving in tropical waters, I felt obliged to share with the readers of SKIN DIVER some information I recently obtained from an article by Doctors Fisher and Orris entitled "Aquatic Contact Dermatitis" which appeared in Curtis, November 1974, pp. 687-695.

Species of marine life such as portuguese man-of-war, jellyfish, stinging corals, and sea anemones contain nematocysts, or "stinging cells." These cells are capable of "firing" a thread-like tube which is coiled up within the cell. If the dart-like end of the tube comes into contact with the skin, both human and otherwise, its discharge speed will carry it into the skin where it deposits a toxic substance. The authors believe fresh water or mere friction can initiate the "firing" of the cell. The severity of the effect depends on the toxicity of the venom of the particular species involved. It might range from a mild stinging sensation, to shock, or even death to those persons who are hypersensitive to the poison.



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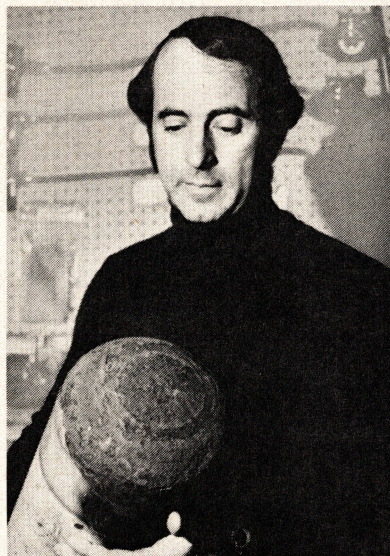
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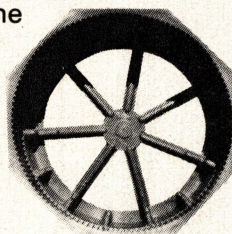
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If such contact is suspected or in fact has been made, the following courses of action are suggested:

(1) Avoidance of fresh water. Nematocysts are activated by fresh water and so, a shower after exposure could intensify the symptoms, (itching or burning sensations) and possibly initiate shock. The affected skin should be gently rinsed with sea water.

(2) Use of alcohol. Any type of alcohol available, including rubbing alcohol, liquor, colognes, or perfumes, should be applied to affected areas.

(3) Use of alkalis. Five minutes after the alcohol is applied, a mixture of sea water and baking soda should be applied to the affected areas. Diluted ammonia water is useful in neutralizing the acid of the venom; flour, shaving cream, may be applied and then scraped off to remove nematocysts.

(4) Use of hot salt water. If nothing else is available, hot salt water, to the limit of tolerance, will help to neutralize the nematocyst venom.

(5) In severe cases. Especially in children, tourniquets on affected limbs may be lifesaving. The tourniquet should always be made of rubber and applied so a finger can be slipped beneath. Its purpose is to *reduce* venous return and not stop arterial flow; it should be released for three to four minutes every hour.

For treatment of coral cuts the authors suggest quick action to prevent secondary infection. The cuts should be washed and carefully scrubbed with soap and water, rinsed and dried. Hydrogen Peroxide is then applied and allowed to "boil" for several minutes, after which, the wound is dried. Isopropyl alcohol is applied and while still wet, the powdered contents of a Tetracycline capsule is sprinkled over the wound and patted into a paste with an applicator. The paste is allowed to dry *without* a bandage as the crust formed serves this purpose.

MICHAEL J. MOONITZ
MASSAPEQUA PARK, N.Y.

... I have just completed the underwater medical course offered by the Royal Navy at the Institute of Naval Medicine, in Portsmouth, England. It was a very good course and I recommend it to any physician seriously interested in sport or commercial diving. There is a long waiting list for this week long, no nonsense course.

WILLIAM T. MERRITT, M.D.
BERLIN, GERMANY

(Continued on Page 12)

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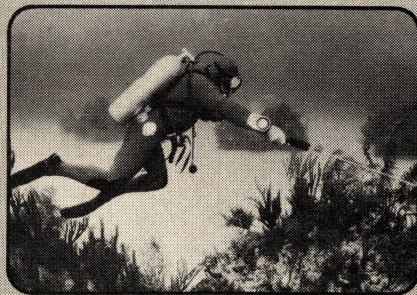
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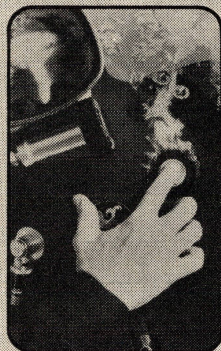
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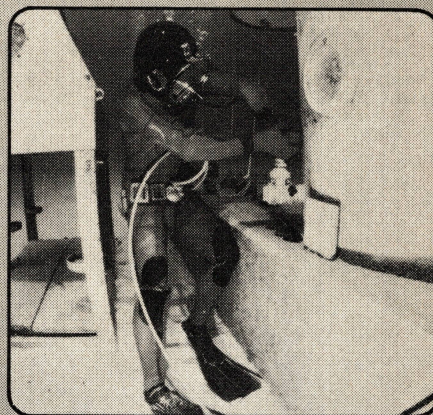
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March 15-16, April 5-6 & May 17-18

YMCA Scuba Instructor Institute, Toledo, Cleveland, Camp Muskingham. (Contact: Dr. John Simpson, 33112 Lake Rd., Avon Lake, Ohio 44012)

March 15

YMCA Scuba Instructor Institute, Eastern New York. (Contact: Walt Hornberger, 7161 Spire Falls Rd., Gansevoort, N.Y. 12831). Pre-testing Feb. 23.

March 15

YMCA Scuba Instructor Institute, Western New York. (Contact: Walt Hornberger, 7161 Spire Falls Rd., Gansevoort, N.Y. 12831). Pre-testing March 2.

March 22-29

NAUI Scuba Instructor Certification, Santa Barbara, Ca. (Contact: NAUI Hdqrs., 22809 Barton Rd., Grand Terrace (Colton), Ca. 92324)

March 29-30, April 19-20, May 10-11

YMCA Instructor Institute, Tulsa, Oklahoma. (Contact: Ray Anderson, 1724 Elm, Lawton, Oklahoma 73501)

April 5-12

PADI Instructor Training Course, Nassau, Bahamas. (Contact: Fran Ballard, East Bay St., Box N-1658, Nassau, Bahamas)

April 5-6; May 10-11; June 7-8

YMCA Scuba Instructor Institute, Chicago, Ill. (Contact: Frank Van Santen, 525 Dara James Rd., Des Plaines, Ill.)

April 18-20

NAUI-YMCA cross-over certification, Chicago, Ill. (Contact: Jay Hytone, 1702 Keo Way, Des Moines, Ia. 50314)

April 19 — June 15

PADI Instructor Training Course, Boston, alternate weekends. (Contact: Phil Holt, P.O. Box 216, Gloucester, Mass. 01930)

April 19

YMCA Scuba Instructor Institute, New England. (Contact: Walt Hornberger, 7161 Spire Falls Rd., Gansevoort, N.Y. 12831). Pre-testing Feb. 22.

April 25-27; May 3-4 & 10-11

PADI Instructor Training Course, Chicago. (Contact: Ralph D. Erickson, 6301 N. Sheridan Rd., Chicago, Ill.)

April 26-27 (first of five weekends)

NAUI Scuba Instructor Certification, Rockport, Mass. (Contact: NAUI North Atlantic Branch, Box 291, Back Bay Annex, Boston, Mass. 02117)

April-May (three weekends)

PADI Instructor Training Course, Marion, Iowa. (Contact: Michael Ster, 1145 W. 8th Ave., Marion, Iowa 52302)

June

NAUI Scuba Instructor Certification, Seattle, Wash. (Contact: NAUI North Pacific Branch, 6531 N.E. 198th St., Seattle, Wash. 98155)

June, July, August

YMCA Scuba Instructor Institute, Little Rock, Ark. (Contact: Glenn Galtere, 2806 Harrisburg Rd., Jonesboro, Ark. 72401)

June 1-8

PADI Instructor Training Course, Miami, Fla. (Contact: Jesus Otero, 971 SW First St., Miami, Fla. 33130)

June 7-8

NAUI-YMCA cross-over certification, Rockport, Mass. (Contact: Dave Michael, 27 Concord Ave., Acton, Mass. 01720)

June 29-July 5

PADI Instructor Training Course, Marquette, Mich. (Contact: George & Betty Tomasi, 455 E. Ridge, Marquette, Mich.)

June 14-21

NAUI Scuba Instructor Certification, Long Island, N.Y. (Contact: NAUI North Atlantic Branch, Box 291, Back Bay Annex, Boston, Mass. 02117)

FISHTALES

THAT'S IT! IT JUST HIT ME!
ALL THIS TIME I'VE BEEN
WONDERING WHO I AM AND WHY
I'M HERE, AND IT JUST DAWNED
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ME AS AN AMBASSADOR OF
BEAUTY TO GRACE THE EXPANSES
OF OTHERWISE MUNDANE
ocean terrain...

... SHE COULD'VE PUT
ME IN A BETTER
NEIGHBORHOOD.



Editorial

HOW DID IT HAPPEN?

by the Publisher



This issue of SKIN DIVER carries the complete word-for-word details of the newly passed Los Angeles County Diving Ordinance . . . approximately 4400 words of restrictive, prohibitive laws and regulations. It is longer than the Declaration of Independence, and more complex than the original Constitution. This one piece of legislation, which was passed so swiftly, perhaps represents the greatest wrong . . . worst injury . . . ever inflicted upon the sport of diving. It is a classic example of government working against the people, instead of working in their behalf.

You ask . . . "how could such a thing happen?" The answer does not come easy. It was a unique, and surely incredible, combination of many key factors: Lack of unity among divers, strong-arm politics, pressure from the news media, shortsness of time to react, and the naive thinking of a few in diving, who felt government control could be good for the sport. It was as though everyone was in a state of narcosis, while the treasured freedom of our sport took a deep dive into oblivion.

It is virtually impossible to trace this governmental fiasco back to its origins. The story is clouded, and tangled in a mass of accusations and counter-accusations. We may never know who really started this terrible thing. Obviously, it had its beginnings from within the sport, and otherwise the Los Angeles Times and other newspapers would never have launched their so-called expose. Lurid tales of scuba deaths and poor training practices originated from the intimate disclosures of a few well-meaning people in diving (possibly instructors) who were upset and frustrated with the apparent deterioration of safety and training standards. I emphasize ap- parent because these misguided souls saw the picture from their own personal point of view. They had little idea of the overall picture, nor did they realize the fact that diving has grown safer in recent years, instead of more dangerous. Little

did these well meaning "do-gooders" realize what destructive forces would be conjured up by their innocent tatling. And most of them (the pro-legislation divers) were shocked and horrified by the final outcome.

With the stage set for tragedy, in charged the news reporters . . . like the marines landing at Iwo Jima. To the news reporters, this was a real scoop — the kind of sensationalism that makes front page headlines. Neither the reporters nor their editors were divers. They did not examine the full picture, nor were they in a position to evaluate the situation fairly. The end product turned out to be a sad series of sensational stories, giving a distorted picture with erroneous facts.

Before the smoke of confusion could even begin to clear, the L.A. County Board of Supervisors jumped into the act. A state of "emergency" was declared on diving within the Los Angeles area, and County Administrators (again . . . not divers) were instructed to draft restrictive diving legislation. The situation was beyond belief! Overnight, the sport of diving had been put on trial and condemned to plead its case. The County Supervisors — delivering a verdict without the first had acted as prosecutor, judge, and jury — never uttered a word in defense. It was as though the despicable days of the Salem witch-hunts had returned. Supervisor Hahn had issued a decree, "There will be laws regulating diving."

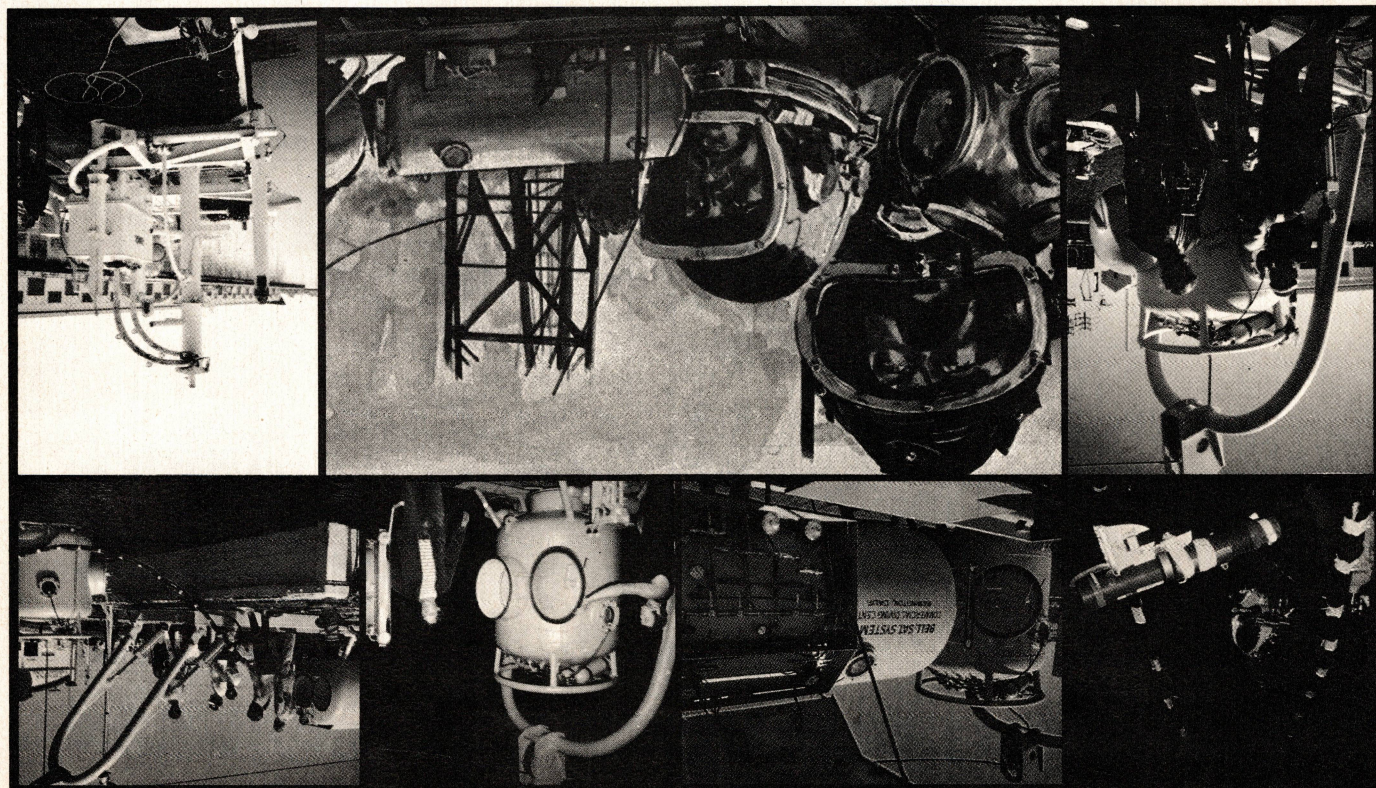
From here on, the situation really went down hill in a hurry. The job of drafting the law was turned over to the Department of Parks and Recreation . . . still another bureaucratic group of non-divers. This department, in turn solicited recommendations from the L.A. County Underwater Safety Committee — an unwieldy conglomerate of diverse diving interests, law enforcement people, lifeguards, and other county agencies. This move was a little bit like asking the divers for recommendation on whether they preferred hanging or the gas

chamber as their punishment. Many of the leaders in diving had been intimidated and coerced into helping draft the regulations . . . under threat of even worse laws being written by non-diver bureaucrats.

It should be made clear at this point that none of the scuba training and certification associations were ever in favor of government control or regulation. On the contrary, the majority of scuba instructors belonging to YMCA, PADI, NAUI, and NASDS were (and still are) strongly opposed to government interference. Only a few individual instructors ever supported the move for county diving regulations. Again, these were the people who saw things from their own narrow point of view, and sincerely believed government control could be good for diving . . . if done right. But the bureaucrats had no intention of "doing it right." They were much more interested in ramrodding through a piece of legislation at any cost . . . to the public, that is. Still reeling from the stunning blows of both, the newspapers and county government, the diving industry tried desperately to rally a strong defense. Facts and figures on the safety record of diving were scattered, and it would take time to collect the data. But the Board of Supervisors would not wait. The deadline for a final draft of the diving laws was thundering down the track like a speeding freight train. Nothing could stop it now. The Board of Supervisors had based their decision on the newspaper stories, and they didn't want to be confused by the true facts in the matter.

The outcome is clearly the greatest travesty of justice ever thrust upon the sport of diving, and indeed a mockery of the so-called "democratic system of government." It is a collection of unrealistic, unworkable, ineffective rules which are totally unwanted by the majority of people in diving. Read them over carefully, and see if you can figure out how these laws are going to make diving any safer???

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June 14-21

NAUI Instructor Qualification and Training Course, San Diego, Calif. (Contact: NAUI Hdqrs., 22809 Barton Rd., Colton (Grand Terrace), Calif. 92324)

July

NAUI Scuba Instructor Certification, Peterborough, Ont., Canada. (Contact: NAUI Canada Branch, 10 Monet Ave., Etobicoke, Ont., Canada)

July 13-19

NAUI Scuba Instructor Certification, Minneapolis, Minn. (Contact: NAUI Mid America Branch, Box 14156, University Station, Minneapolis, Minn. 55414)

July 14-21

NAUI Scuba Instructor Certification, Buffalo, N.Y. (Contact: NAUI North Atlantic Branch, Box 291, Back Bay Annex, Boston, Mass. 02117)

July 19-21

NAUI-YMCA cross-over certification, Buffalo, N.Y. (Contact: NAUI North Atlantic Branch, Box 291, Back Bay Annex, Boston, Mass. 02117)

August

NAUI Scuba Instructor Certification, Halifax, N.S., Canada. (Contact: NAUI Canada Branch, 19 Monet Ave., Etobicoke, Ont., Canada)

August 4-9

PADI Instructor Training Course, Marshall, Minn. (Contact: Michael Ster, 1145 W. 8th Ave., Marion, Iowa 52302)

August 8-10, 22-24 & Sept. 6-8

YMCA Scuba Instructor Institute, Bradenton, Fla. (Contact: Mike Sorvick, 4200 Ironwood - Apt. 308B, Bradenton, Fla.)

August 16-24

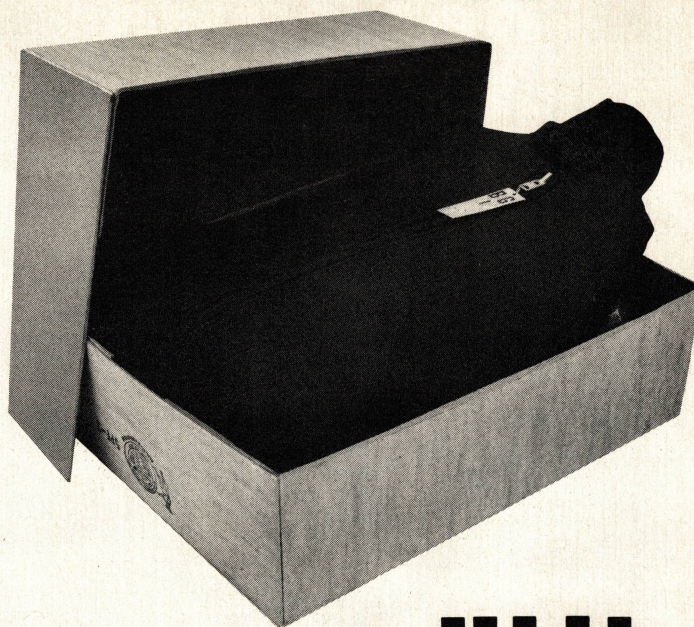
PADI Instructor Training Course, Long Beach, Calif. (Contact: Ted Boehler, P.O. Box 177, Costa Mesa, Calif. 92627)

August 16-24

NAUI Scuba Instructor Certification, Chicago, Ill. (Contact: NAUI Mid America Branch, Box 14156, University Station, Minneapolis, Minn. 55414)

August 23-24, 30-31 & Sept. 6-7

PADI Instructor Training Course, Danville, Ill. (Contact: Harley Crawford, 211 Spelter Ave., Danville, Ill. 61832)



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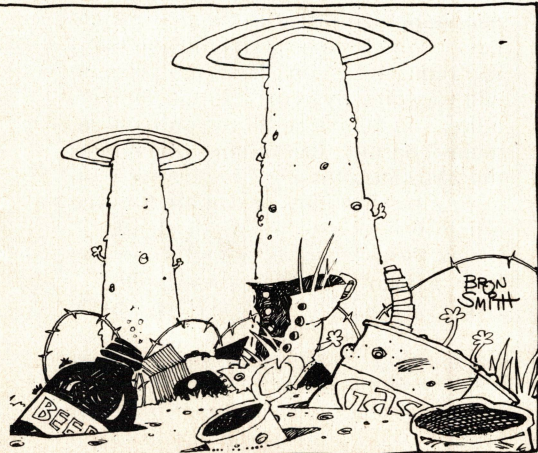
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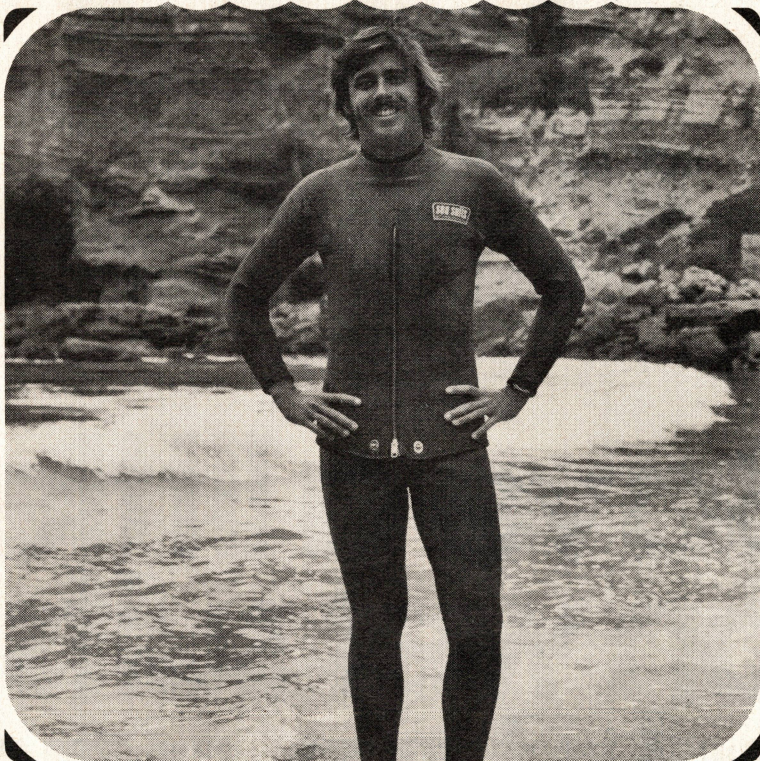
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(Continued from Page 8)

... One disadvantage to the BCP not mentioned in your product report is that addition of the BCP to the Scubapro back pack covers up the built-in handles in the back pack. This can be remedied easily by adding an accessory handle to the stainless tank band.

A big advantage to the BCP that was not mentioned in the report is that the BSP's position in the back makes it very comfortable to swim on your back while surface swimming, which has several advantages. One advantage is that with your face up you can breath without a snorkel and even take off your mask if you want. If you have a goody bag full of abs or lobsters you can set it on your chest, out of the water, and eliminate the drag of pulling it through the water, which really makes swimming much easier. Finally, on your back the BCP lifts you out of the water which means there is less of you to drag through the water, making swimming easier.

A tip on the use of the BCP: move your weights around to the back of your belt. Otherwise the BCP has a tendency to tilt you over on your face when just floating in one spot.

DAVID BRANNON

SAN LUIS OBISPO, CALIF.

... I hate to be a negative person, however, Jerry Symons' article "Vest Explosion" was full of errors ... starting with a declaration of whose law relates to what. The gas law known as the Law of Charles does not 'tell us how to compute the increase in temperature as pressure is increased and volume stays the same'! Charles law only deals with the volume change associated with a change in the absolute temperature. Charles maintained the pressure of a gas constant and discovered that the volume would vary directly as the absolute temperature. Few people realize that it is the law of Gay-Lussac which states that if the volume is kept constant (scuba tank) the pressure will vary directly as the absolute temperature. The definition "if the pressure remains constant, the volume will vary as the absolute pressure" is obviously an error also. The closing comment in the article was cryptic to say the least ... 'know the science of diving! Know the basic gas laws and how they apply'! FRED CALHOUN BOSTON, MASS.

Concerning "Vest Explosion," I must have forgotten my lectures if I said: "If the pressure remains constant, the volume of a gas will vary as the absolute



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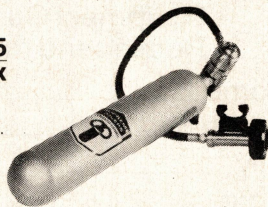
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pressure." Somewhere between my head, my pencil and my typist, I meant to say, "if the pressure remains constant, the volume of a gas will vary directly as the absolute temperature." Jerry Symons

... I would like any information sent to me on cases of known allergic reactions either to mask, snorkel or mouthpiece of regulator. I feel that this is occurring with sufficient frequency to warrant the inauguration of a research project. The more details that are submitted to me, the better able I will be to sift through the facts and probably come up with answers.

JOHN E. ALEXANDER, M.D.

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... There's got to be other divers interested in marine biology or going to college to study this, who dive: both in the states and in other English and Spanish speaking countries. I can't seem to find any willing to be pen pals so that marine biology knowledge can be more universal. With international pen pals, and even from different areas of the United States, we can pool our experience and information for a more complete marine biology picture. Anyone wanting to exchange letters, underwater slides, information, please write.

TITANIA MILLER

11 N. RICHLAND,
FREEBURG, ILL. 62243

... On June 19, 1864, the Confederate warship *Alabama* was sunk off Cherbourg, France, by the U.S.S. *Kearsarge*. Upon its sinking the C.S.S. *Alabama* took with it an outstanding maritime record of achievement, unmatched by any other ship, Union or Confederate, during the Civil War period.

I represent a gentleman who has acquired a coffee cup taken from the C.S.S. *Alabama* before it was sunk. He has asked me to contact some distinguished sources that may have an interest in seeing the cup, learning more about it, or possibly suggesting other parties or persons who would be interested. He desires to share his "find" with others.

PAUL H. MOONEY

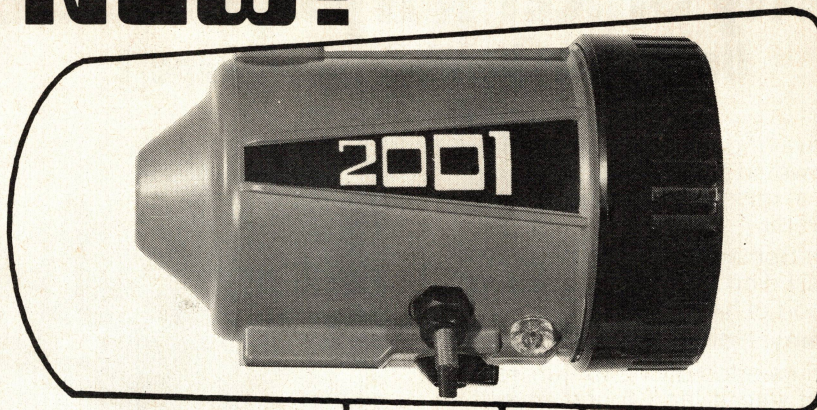
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An interview with: Petty Officer Terry Byer, U.S.N. Underwater bomb disposal expert.

Parkway: You've got to be kidding. Why would anyone want to tangle with explosives? Especially underwater.

Byer: Someone's got to do it. Besides, I didn't start out that way. It just sort of happened.

Parkway: How's that?

Byer: I started diving for fun, really got into it, and found myself teaching college oceanography students and doing salvage and construction. When I joined the Navy, diving really seemed the best way to go. After becoming a military salvage diver, I trained at Explosive Ordnance Disposal and basic Airborne School.

Parkway: Does that mean you jump from a plane in search of live explosives?

Byer: It can. In such an operation, I would wear full scuba gear and full parachute gear. Upon entering the water, the parachute gear is ditched, and the mission continues with scuba.

Parkway: What's the most dangerous part of your work?

Byer: Probably the occasional encounter with old ordnance. It seems rusted and dead on the outside, but inside it may be as ready to go as the day it sunk.

Parkway: Do you work alone?

Byer: Not if I can help it. We usually work in four-man teams.

Parkway: Do you wear special military wet suits?



Byer: Not really. Although we sometimes add special features to our suits, we use pretty standard equipment. I usually use a shark-skin two suit.

Parkway: Because shark-skin two is issued by the Navy?

Byer: Well, sometimes they're issued. Other times we can choose from several brands. But shark-skin two suits are always my first choice. When I'm down there nose to nose with a tough one, I need a suit that lets me forget it. It just has to keep me warm and comfortable until everything is safe again. In all the years I've been using shark-skin two suits they've never let me down.

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OUR WORLD — U/W V

For the fifth consecutive year, Our World — Underwater in Chicago will bring together people interested in the protection, conservation, understanding, and enjoyment of the world's watery environment. The festivities begin at the pre-program cocktail party and reception May 2, 1975, in "The Staging Area" — the Tally-Ho and East Rooms of the Sheraton-Chicago Hotel. This informal beginning of the three day function allows divers to meet each other socially, visit more than 40 booths and exhibits and talk with some of this year's outstanding celebrities — Al Giddings, Jack McKenney, Dr. Joseph MacInnis, and many more.

On Saturday, May 3, four concurrent seminar rooms will be running from 9 a.m. to 4 p.m. in the hotel and will cover topics from Wreck Diving to Photography, Sea Life and Mammals to Travel. Special guests in these rooms will include Dr. Glen Egstrom, Dr. Arthur Bachrach, John Steele, Rick Frehsee, and Ernie Brooks III.

At 5:30 the gala scholarship banquet will be the first introduction of this year's Our World — Underwater \$5,000 scholarship winner and other scholarship recipients . . . and then it's over to Medinah Temple at 8 p.m. for this year's film festival.

Dr. Joseph MacInnis, in addition to being the evening's M.C., will show two of his films *The Bowhead Whale* and *Diving at the North Pole*. Al Giddings will share his subaquatic adventures at Palau in his new film *The Sea of Eden*. Ernie Brooks III will present a Multi-Media Presentation, Jack McKenney will contribute *Beneath Grand Cayman Waters*, and Mark Bensen, the 1974 Scholarship Recipient, will give a report on the *Scholarship Adventure*. This year's Our World — Underwater Award will be given to an outstanding leader in the diving community and the 1975 Our World — Underwater \$5,000 scholarship will be awarded.

And, when the day's all over, there's still more, an after-the-show-party from 11 p.m. to 3 a.m. — "The Second Decompression Stop" in the Sheraton-Chicago's 16th floor swimming pool.

Sunday morning starts at 9 a.m. when Careers In Marine Sciences begins — an insight into what is available in underwater occupations presented by the men and women who are actively involved in these careers. Free to students and educators, this year it will also be open to the general public who have purchased Sunday workshop or seminar tickets.

Running concurrently with the careers program is the YMCA's New Adventures In Diving seminar and workshops on Ice Diving; Collecting Artifacts and Marine Life; and Spearfishing In Fresh and Salt Water. The last event of the weekend is

the 1 p.m. pool demonstration of equipment and products.

Special room rates have been arranged at the convention hotel, the Sheraton-Chicago, 505 No. Michigan. \$15 for a single; \$22 a double; \$27 for a triple. Tickets for each of the events can be purchased before May 1 individually (\$5 for the cocktail party \$5 for the seminars, \$4.50 for the festival and \$3 for the workshops) or as a package for \$15.50. For more information write to Our World — Underwater V, P.O. Box 643, Wheaton, IL 60187. >#

SAN ANTONIO FILM FEST

The Trinity University Scuba Diving Club of San Antonio, Texas, has planned an underwater film symposium to be held at Trinity's Laurie Auditorium on March 22, 1975. The day will be filled with films and lectures dealing with diving in the Gulf of Mexico, including guest speaker Carl J. Clausen of the Texas Antiquities Committee presenting *Graveyard of the Gulf* about the Spanish galleons of Padres Island; James Creighton, an award winning underwater photographer presenting a series of slides taken around the oil rigs in the Gulf; and Dennis Bowman of the Marine Biomedical Institute in Galveston presenting a slide series about the Flower Gardens off the Texas/Louisiana coast.

The evening show, starting at 8 p.m., will feature *L'Aventure Cousteau*, presented by Tom Horton of the Cousteau Society. There will also be photographic and equipment displays available for viewing throughout the day. Tickets for the event are \$3. For more information contact: Robert Crews, Box 120-715 Stadium Drive, Trinity University, San Antonio, Texas 78284. Telephone (512) 824-7688. >#

OUR FUTURE IN DEPTH

Syracuse, New York, will be the setting of an underwater seminar and film festival to be held March 8, 1975. The seminar session, which will run from 9 a.m. to 5 p.m., will feature talks on diving in New York state underwater photography, underwater archaeology, and other topics of interest to the diving public. There will also be a career session for high school students and guidance counselors with a variety of speakers covering careers in marine sciences.

The film festival, which will begin at 8 p.m. in the Regent Theater in Syracuse, will present underwater photographers Stan Waterman, Paul Tzimoulis and Bob Hollis. A reception will follow the evening program to allow divers a chance to meet the presenters from both the day and evening programs. Tickets are available from National Aquatic Service, Inc., 1425 Erie Blvd. East, Syracuse, New York 13210. Telephone (315) 479-5544. >#



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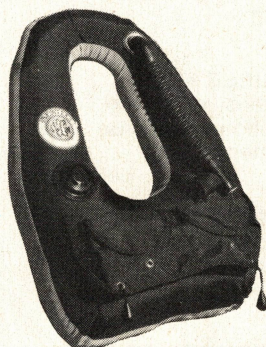
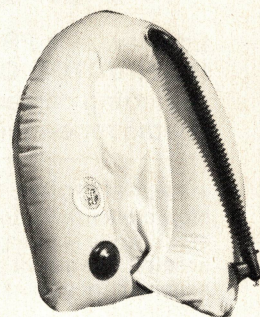
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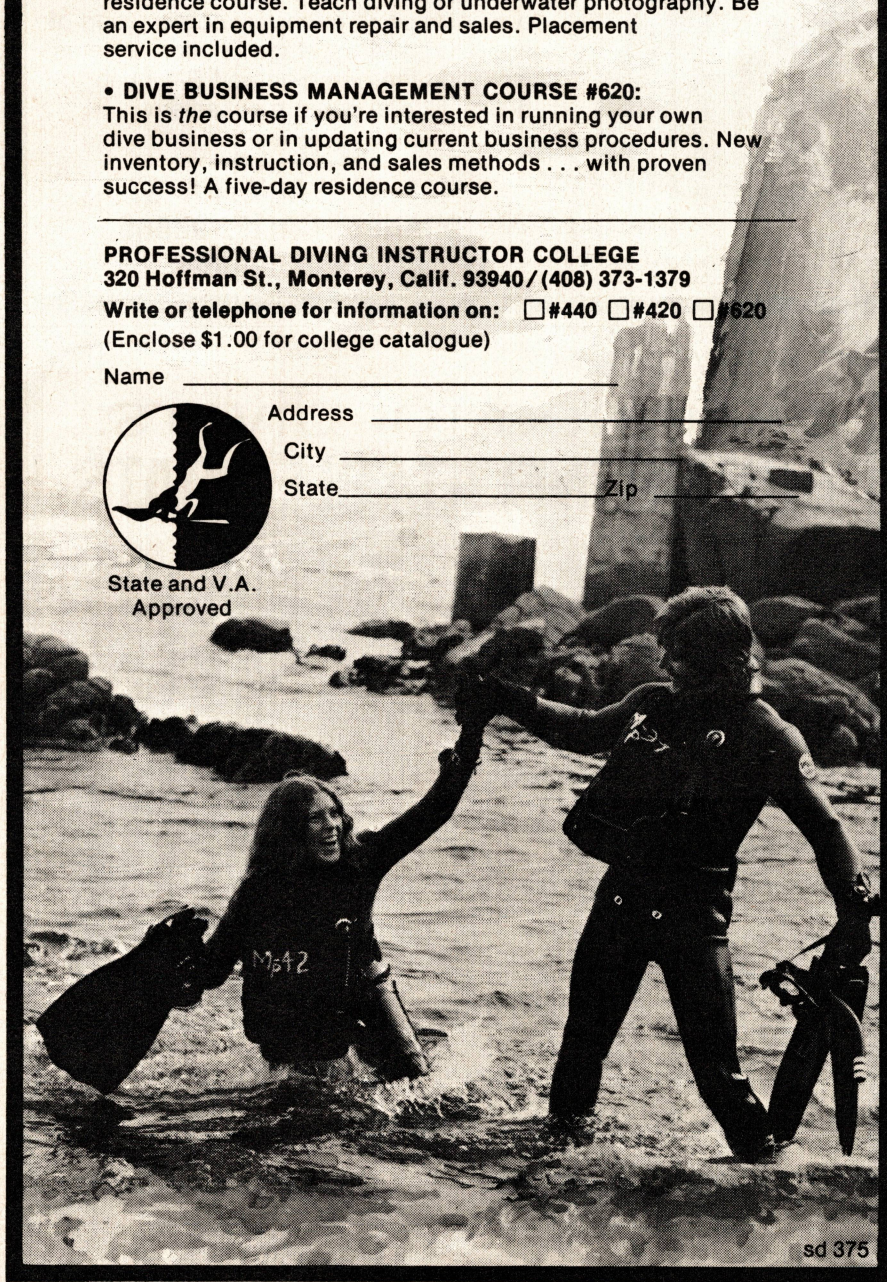
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March 8

Boston Sea Rovers 21st International Underwater Clinic. Daytime seminar, Boston University; evening show, John Hancock Hall. (Contact: Robert Newberry, 87 Beltingham St., Chelsea, Mass. 02150)

March 8

Our Future in Depth, Syracuse, N.Y., 9-5 p.m.; evening show, Regent Theatre, 8 p.m. (Contact: National Aquatic Service Inc., 1425 Erie Blvd., E., Syracuse, N.Y.)

March 14

NAUI Int'l Photographic Competition, Seattle, Wash. (Contact: NAUI Hdqrs., 22809 Barton Rd., Grand Terrace (Colton), Calif. 92324)

March 22

California Underwater Exposition '75, Anaheim Convention Center, displays, 1:30 p.m.; all-California show, 2:30-5:30 p.m.; festival, 7:30 p.m. (Contact: California Underwater Exposition, Box 10931, Santa Ana, Calif. 92711)

March 22

Trinity University Scuba & Diving Club Gulf of Mexico films & lectures, San Antonio, Texas. (Contact: Robert N. Crews Jr., 715 Stadium Dr., Box 120, San Antonio, Texas 78284)

March 22

NAUI Man in the Sea Symposium, Seattle, Wash. (Contact: NAUI Hdqrs., 22809 Barton Rd., Grand Terrace, Calif. 92324)

April 5

Underwater Symposium & Film Review. Symposium, Harvard University, Cambridge, 11 a.m.; film review, John Hancock Hall, Boston, 8 p.m. (Contact: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, Mass. 02117)

April 12

Inner Space '75, Southeastern Mass. University, North Dartmouth, Mass. (Contact: Inner Space Society, SMU, North Dartmouth, Mass. 02747)

April 13

Tacoma Scubaneer's 16th Annual U/W Treasure Hunt. (Contact: Dennis Putnam, 7731 182nd Ave. E, Sumner, Wash.)

June 13-15

New York State Divers Assoc. Convention, Lake Placid. (Contact: Gary Brandstetter, 45 Algonquin Dr., Plattsburgh, N.Y. 12901)

June 21-27

CEDAM International Annual Meeting & Symposium, Akumal. (Contact: CEDAM International, 5820 Burning Tree Dr., El Paso, Texas 79912)

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HERON ISLAND

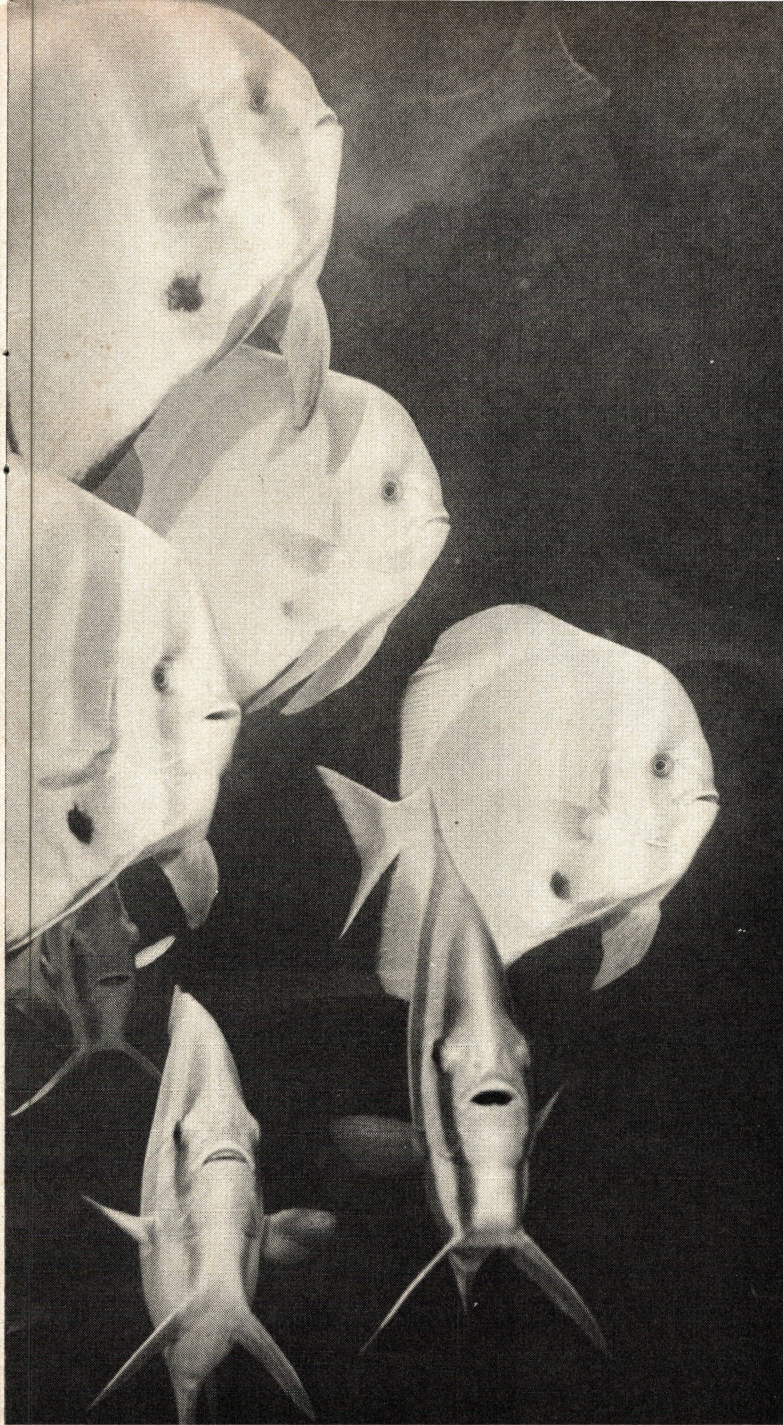
A Fish an

Heron Island is an oval shaped gem in the Capricorn group of islands along Australia's Great Barrier Reef. It is about 45 miles from the port of Gladstone, on the central Queensland coast, and it has a total circumference of about one mile — you could walk around the whole of Heron Island in half an hour. During that walk, however, you would be enthralled with the lush vegetation, the beautiful sand beaches and the clear blue water that hides spectacular reefs.

A diver could spend weeks, or even months, exploring all of the facets of the exotic life on Heron Island: it is the perfect diving spot for fish watchers, reef explorers and underwater

photographers. If you're a collector or spearfisherman, though, you'd better forget it because Heron is a marine sanctuary and hunting or collection of any kind is strictly prohibited. In fact, there's a small scientific research station located on Heron which is operated by the Great Barrier Reef Committee and affiliated with the University of Queensland.

There's no town on Heron Island, but there is a charming holiday resort with two equally charming resort diving pros. Tony and Kathy Tubbenhauer are a husband and wife team whose love of the sea and its creatures is infectious. The couple, who are both in their early 50s, were quite successful



d Coral Paradise

By Jack McKenney

in the business world, but decided to retire to a way of life that has become extremely rewarding and meaningful for them. They've turned their hobby of diving into a satisfying career as professional underwater people.

The Tubbenhauers live in a small cottage shaded by huge, lush pisonia trees and fringed by graceful cauarinas. The dominant pisonia forest on Heron is an ideal habitat for the many gregarious white capped noddy birds, curious mutton birds and saucy sea gulls that abound on the island. And, as its namesake implies, proud stately herons can be seen traipsing through the foliage or out feeding on the reef at low tide.

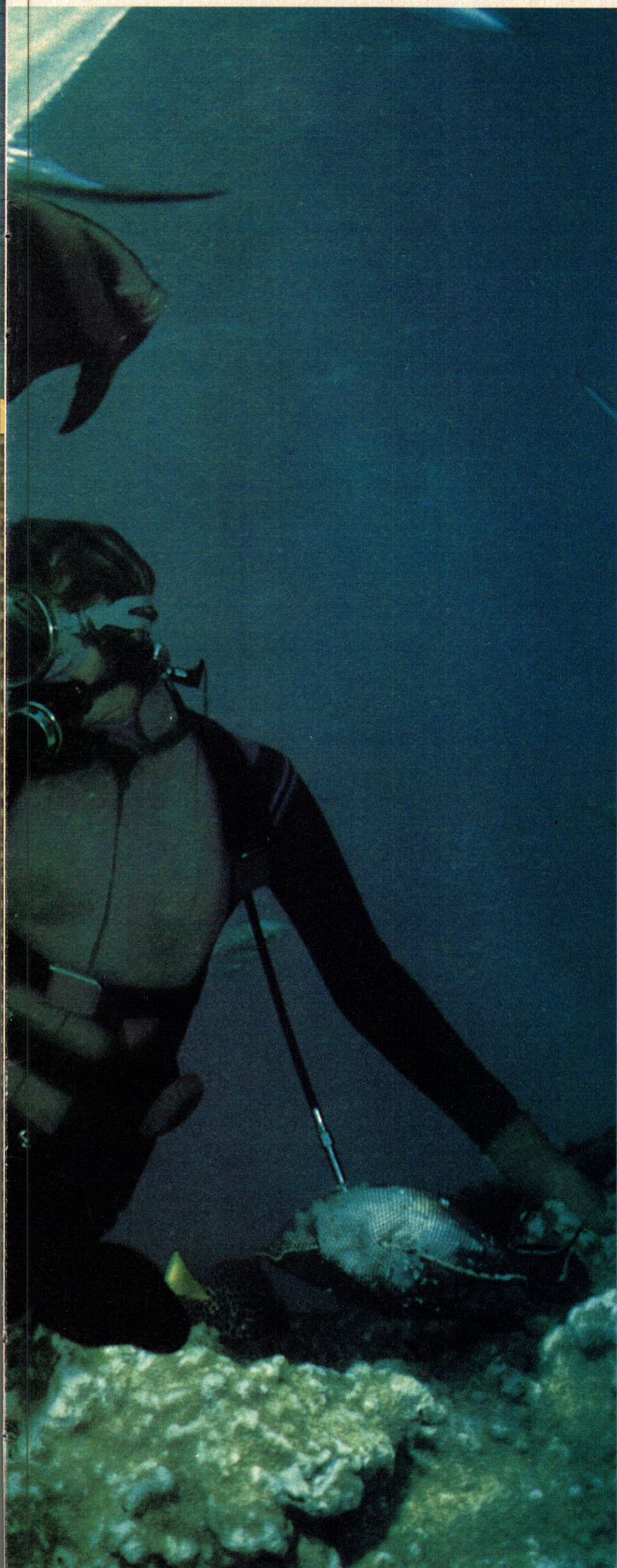
The resort itself can accommodate 200 guests in a series of facilities from lodges, which will sleep up to four people with a shower and toilet facilities centrally located nearby, to the Harbour View, Reef View and Capricorn suites, each with full facilities. Rates range from \$14 per person in one of the lodges, to \$102 for four adults in the Harbour View Suite. All prices, which are quoted in Australian dollars, include three meals a day. (An Australian dollar is worth \$1.33 US).

Electricity on the island is 240 V AC, so North Americans with strobes and electric shavers should bring an electrical converter with them. There is a freshwater swimming pool,

One of the most appealing activities while diving Heron Island is feeding the pet batfish in just 10 feet of water on Big Bommey.

Heron Island is also a close-up photographer's paradise, however: soft corals, nudibranch and starfish of every size and description abound throughout the entire area.





tennis courts, a small gift shop, dive shop, main dining room, bar and recreation center. Dress is always casual and every night movies are shown in the lounge for the guests and occasionally Tony and Kathy present some of their excellent slides taken on the reef. Neither Tony nor Kathy are instructors, so there is no program for teaching diving on the island, but the Tubbenhauers will introduce guests to snorkeling.

One of the most popular areas around Heron Island for both snorkeling and scuba diving is Big Bommey, a gigantic coral head which lies just five minutes offshore from the resort by boat. It sits in about 25 feet of water and humps up to within eight feet of the surface. Actually, Bommey is made up of, or is surrounded by, two or three other smaller coral heads and is situated next to a shallow staghorn coral forest.

The main attraction of Big Bommey is the profuse amount of sea life that abounds there. Tony had told me of the manta rays that come in to feed and I was especially anxious to get some good shots of them, but as luck would have it they were there the day prior to my arrival and, of course, they showed up the day after I left. That happens to me all the time, but it really didn't matter because there was so much else to see.

I put-putted out to the Bommey with my hosts in a delightful two cylinder, diesel powered, 26 foot long diving boat called the *Noddy Tern*, with Kathy expertly manning the helm. The resort also has a 17 foot runabout, a 26 foot glass bottom boat and a 25 foot, six cylinder diesel powered barge capable of handling 20 divers and running at 15 knots. We tied up to the buoy marking Big Bommey and made ready to dive.

When I entered the water, I couldn't believe my eyes. Immediately engulfing me from all sides were hundreds of fish; not tiny reef fish, but 10 to 20 pounders. Some were huge saucer shaped batfish with faces that reminded me of people. There were big red emperor sweetlip, which were extremely curious and bold. Canine-like teeth protruded from their lower jaws when their mouths were open, and they reminded me of playful pups. Fantastic varieties of angelfish, butterflyfish that I had never seen before, lionfish (called butterfly cod in Australia), mutton snapper, coral trout and multitudes of silvery fish milled and skittered about as in a three ring circus.

Things really got exciting when Kathy came down carrying a mesh bag full of bread. The fish went wild! The sweetlip especially had a difficult time containing themselves and minding their manners. Whenever Kathy eased her hand into the bag to extract some food, they dived in head first, and it was only by sheer determination and some luck that she was able to feed the batfish without the sweetlip stealing the food.

The batfish were especially impressive. When I mention to

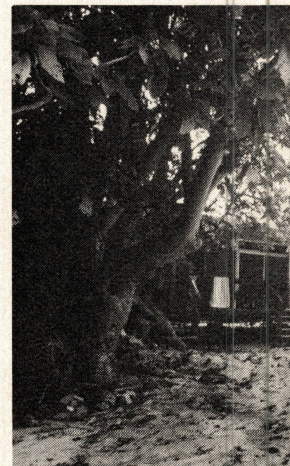


photography by author





photograph by Tony Tubbenhauer



people that fish have distinct personalities, they look at me as though I'm balmy, but I really think the batfish have an almost sophisticated and regal air. There was usually a bit of a current running around Bommey, and like sentinels on a misty moor, the batfish would stand motionless in the current with only their tiny pectoral fins helping them to maintain a stabilizing position. Occasionally they would change rank and file and all eyes would be on me as I focused my camera for shot after shot of these majestic fish.

Some 1150 species of fish have been recorded around Heron Island, and one of the more handsome of these is the lionfish, several of which live under a crevice on Bommey. The lionfish, also called butterfly cod, display a dazzling array of feathery fins and stripes of cream, yellow, pink and warm brown, with a sluggishness that belies the remarkable speed and agility they exhibit when they're feeding on tiny tropicals. Their dorsal fin is made up of about a dozen venomous spines which can cause a diver severe pain, but they are not considered fatal. Because of their lethargic nature, it's relatively easy to maneuver them out into the open with a snorkel to pose them for a picture. Just be careful not to touch their dorsal fins.

As well as the tremendous amount of colorful fish life on the Bommey, there is also a large green moray eel that Tony and Kathy have been feeding on a regular basis. Because the eel is somewhat cautious and slow about accepting food, the bits of bread are a natural target for the sweetlip which hangs just over Kathy's shoulder to dart in and pick up the offering before the eel can react. Out of ten handfuls, I think the eel was only able to garnish about two of them.

If your thing is macrophotography, you certainly won't be disappointed with Heron Island. I counted and photographed eight differently colored serpulids on one side of Big Bommey ranging in colors from bright pink to candy striped blue and white. And the nudibranch were something else! There were ones that were pink and frilly, others that were bulbous and

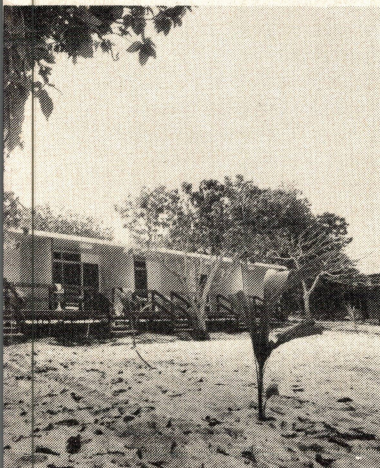
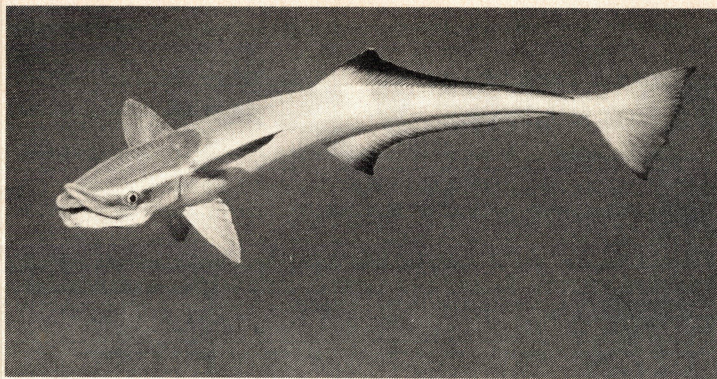
white with a fancy brown and yellow pattern running down their middle, and yet another that resembled a tiny green dragon, complete with horns. From nudibranchs to fish to eels to corals — it's impossible to be disappointed with the tremendous variety of life to be photographed on this very unique coral head just five minutes off Heron Island.

Another very popular area for resort divers is Wistari Reef, which stretches to the southwest of Heron Island starting about a mile from the resort. Although the channel between the reef and the island drops as deep as 125 feet, Wistari Reef itself is only 10 to 20 feet below the surface and offers spectacular diving. Huge acres of staghorn coral were predominant when I dived there. Anemones in coral holes waved their tentacles to trap bits of food, while orange anemonefish popped in and out among the stinging tendrils.

Some of the prettiest soft corals, ranging in shades from pure white to fire engine red with numerous shades of pink thrown in, were abundant on this reef. Although many of the same corals which abound at Wistari could be found near the Big Bommey, there appeared to be many different varieties of fish and one green velvety, elongated fish with a horn protruding from his forehead completely blew my mind. I only caught a glimpse of him as he swam by me and vanished.

Visibility around Heron Island rarely exceeds 40 feet, which would be classed as poor if the diving was in the 100 foot range. As 95 percent of the good diving is done in less than 30 feet of water, however, the visibility is more than adequate. Water temperature is around 70 degrees and a full wet suit is recommended for prolonged water exposure. I wore eighth inch pants and a three-sixteenth inch jacket, and could spend about three hours in the water before I began to get chilled. After a short rest or a break for lunch, I would always be ready to hit the diving again.

Tony has six regulators for rent at \$2 per day. The procedure is to buy the regulator for \$54, and then get a refund minus the



Tony and Kathy Tubbenhauer are the dive guides in residence on Heron Island, a tropical gem on the south end of Australia's Great Barrier Reef. There are comfortable cottages on the island which can accommodate up to 200 visitors, and all the diving gear needed for delightful reef tours. The deformed remora is a permanent resident at Big Bommey.

rental fee when you return it. He has 20 tanks which rent for \$2 per day, 20 wet suits and can supply weight belts, but does not use, or supply, personal flotation devices. Visiting divers would be wise to bring all of their own basics including a regulator and wet suit. A reef excursion with all equipment provided is \$12.90. When you only require a tank it is \$7.40. Air fills are \$1.40. Providing all divers have the above mentioned personal gear, Tony and Kathy can handle about 50 divers a day. More tanks are available if needed.

Generally, one or two dives are made in the morning and another one or two in the afternoon. Because of the tidal currents, it's usually best to dive Big Bommey after lunch. The currents aren't so bad that they prevent one from diving, but, of course, it's more comfortable for photography to work in calm water conditions. Twice each month spring tides occur which have the greatest water movement, resulting in about a nine foot tide. In between spring tides, neap tides, producing a five to seven foot difference, occur about every six hours.

During low tides "reef fossicking," (walking out on the reef) is very popular with the hotel guests. It's important to time the walks carefully so you don't get caught during a fast incoming tide. Tony and Kathy have sneakers and walking sticks available for reef walkers, and also have the latest tide tables. It's a fascinating experience to walk out on the Great Barrier Reef, the greatest organic structure in the world. It makes one feel rather humble. . . .

Summer in the southern hemisphere is from November through March, and it's at this time of the year, when the average mean temperature is around 78 degrees at Heron Island, that the green and loggerhead turtles ponderously make their way up to the beach to lay their eggs in the warm, moist sand. During low tides turtles can often be seen mating in the shallows. A couple of times when we came across them in deep water, panting away in wild abandonment, I slipped out of the boat and tried to get close enough to document the

ecstatic moment, but they bolted and made off for quieter parts where they could continue undisturbed. To this day I swear the males gave me dirty looks as they swam off in hot pursuit behind the larger females.

On another occasion when I was drifting down about 40 feet to a new anchorage and photo location, I discovered a large green turtle just resting by itself on the bottom. This time I did manage to swim quietly up to him and snap off a few pictures before he swam off.

Quite a lot of traveling is required to reach Heron Island from the States. I boarded a Qantas 747 in San Francisco, and 17 hours and two movies later (with one stop in Hawaii), I landed in Sydney, Australia's booming metropolis and home of one of the most spectacular contemporary opera houses in the world. From Sydney I boarded a TAA airlines plane, and three and a half hours later I landed at the port of Gladstone.

Once in Gladstone there are two methods of getting over to Heron Island. If you're traveling with a great deal of luggage it's best to take the launch over from the dock in town. It's a 20 minute ride by taxi from the airport to the launch for about \$3 depending on which taxi driver you get. The launch is roomy with comfortable seats, which look as though they were liberated from a Greyhound bus, and the trip over lasts two and a half hours with fresh fruit and drinks served on the way.

A faster and more spectacular way to the island is to fly the Helitrans helicopter. The 20 minute trip allows photographers to come up with some spectacular aerials of the island, especially if you bully your way into the front seat next to the pilot. The canopy is a hemisphere of acrylic allowing a 300 degree view. If you're the nervous type, from the front seat you can even keep an eye on the rotor to be sure it doesn't fall off. A good idea is to take the helicopter back and have your luggage returned on the launch. There will be plenty of time to get over to the dock to meet the launch when it comes in. Air fare to and from Heron is \$34 each way.

Perhaps the best method of diving Heron Island is to join a tour put together by the Australian Travel Service, which is available from many travel agents. For \$1,699 all inclusive, per person, double occupancy, departing from San Francisco, you can have a 17 day diving vacation in some of the finest waters in the world. You lose a day due to crossing a time zone on your way to Australia, but gain it coming back.

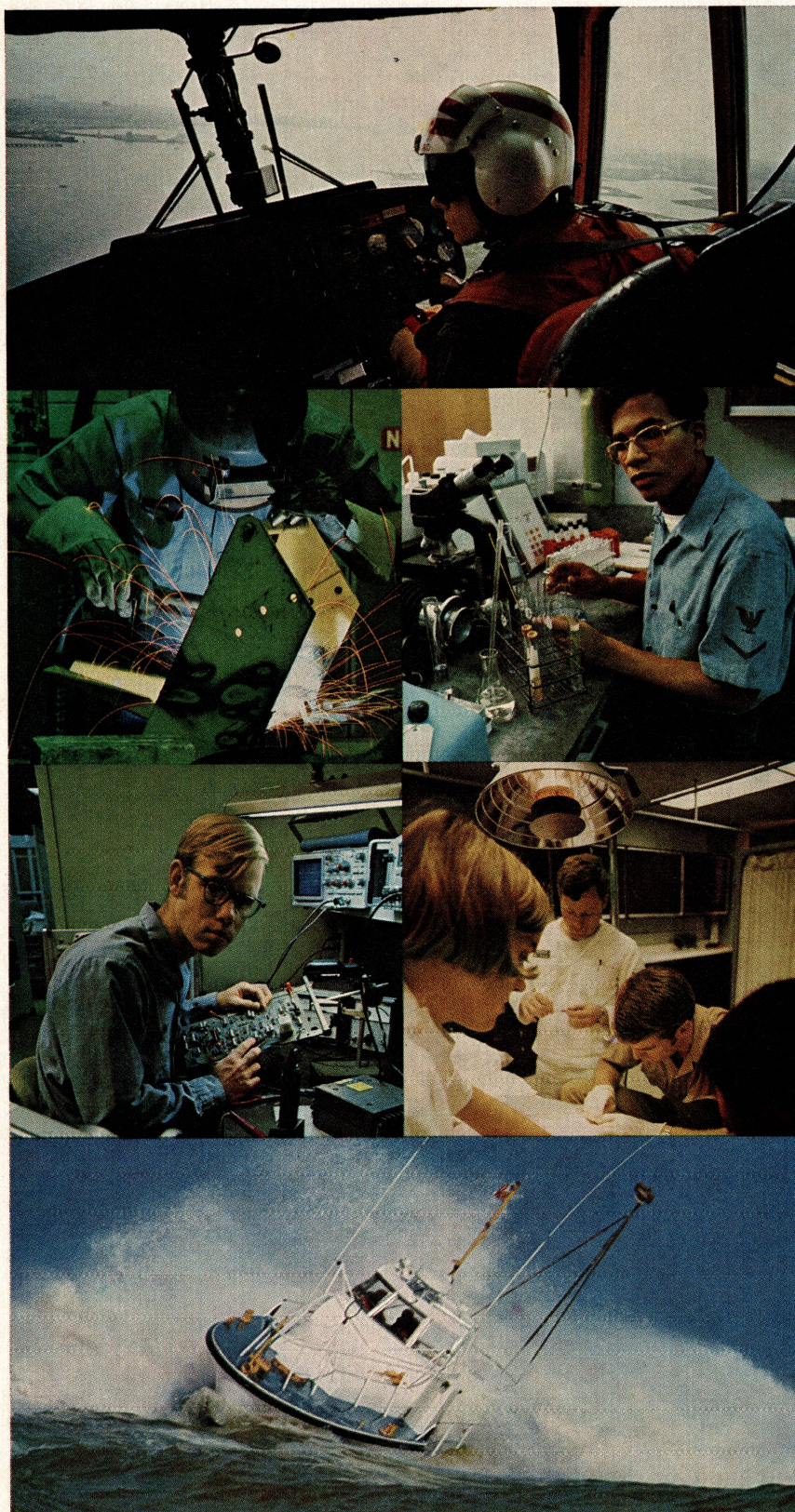
On these tours a day is spent in Sydney sightseeing and shopping, and another day flying from Sydney to Gladstone to Heron Island. All total, five days are spent diving Heron Island, and then you are packed onto the *Coralita*, one of the finest diving charter boats I have ever been on. Capt. Wally Muller cruises the Great Barrier Reef for five days visiting such places as Fitzroy Lagoon, North Reef and Swains Reef.

If weather permits, a journey is made to Saumarez Reef, 220 miles off the coast of Queensland and west of the Barrier Reef. Saumarez is a giant mound of exposed coral, atop which lies the remains of a large liberty ship. The water temperature at Saumarez is 75 to 80 degrees, about five degrees warmer than Heron Island, with visibility up to 200 feet. Although I've never been there, I've seen films taken by Ron Taylor and the diving looks pretty exciting with tuna, mackerel, giant grouper and sharks. Deep crevices and canyons are common.

From the *Coralita*, departure point is Yeppoon Harbour where she docks. It's then on to MacKay with a departure for Sydney. The last day is spent in Sydney catching up on some much needed rest and last minute shopping. For a brochure about the tour write to Australian Travel Service, 6300 Wilshire Blvd. Suite 1115, Los Angeles, Calif. 90048.

For more detailed information about Heron Island's facilities and other attractions in Australia, write to the Australian Tourist Commission, Dept. 254A-2207, 1270 Avenue of the Americas, New York, N.Y. 10020. West coast divers can address any correspondence to 3550 Wilshire Blvd., Los Angeles, Calif. 90010. >

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18035

Sec. 202. **Cylinder:** Shall mean a container with a circular transverse cross-section with the capability of containing high pressure gases.

Sec. 203. **Director:** Shall mean Director of Parks and Recreation of the County of Los Angeles.

Sec. 204. **Exhalation Resistance:** Shall mean the effort measured in inches of water at the mouthpiece necessary to open the exhaust valve in a regulator.

Sec. 205. **Flotation Equipment:** Shall mean any inflatable device used to control a diver's buoyancy.

Sec. 206. **Gauge Lens:** Shall mean the transparent portion of the pressure gauge's outer case that allows viewing of the indicating numbers inside.

Sec. 207. **Hose Reinforcing Braid:** Shall mean the braided fabric layer of lining set in a rubber pressure hose that contributes the strength necessary to contain the pressurized gas.

Sec. 208. **Hydrostatic Test Interval:** Shall mean the maximum allowable period of time between each succeeding water pressure test.

Sec. 209. **Inhalation Resistance:** Shall mean the effort measured in inches of water at the mouthpiece necessary to cause a demand regulator to flow.

Sec. 210. **Internal Case Pressure:** Shall mean the pressure inside the case of a pressure gauge.

Sec. 211. **Intoxicating Liquor:** Shall mean any of those substances defined in Sections 23004, 23005, 23006, or 23007 of the Business and Professions Code of the State of California.

Sec. 211.5. **Dangerous Drugs:** Shall mean any of those substances defined in Sections 11018, 11019, 11020, 11021, or 11025 of the Health and Safety Code of the State of California.

Sec. 212. **Open Water:** Shall mean any body of water other than a swimming pool.

Sec. 213. **Pressure Hose:** Shall mean a flexible tubular device usually made of fabric reinforced rubber used for containing and directing the flow of a pressurized gas from one location to another.

Sec. 214. **Recognized Certifying Organization:** Shall mean an organization whose requirements for certification and recertification of scuba divers and instructors of scuba diving have been recognized by the Director as meeting the requirements set forth in Articles IV through VII, inclusive of this Ordinance.

Sec. 215. **Regulator:** Shall mean a device for controlling the delivery of a gas to the diver relative to ambient pressure.

Sec. 216. **Submersible Pressure Gauge:** Shall mean a device for measuring the pressure within a cylinder while immersed in water.

Sec. 217. **Scuba Diving:** Shall mean diving with a self-contained underwater breathing apparatus.

Sec. 218. **Valve:** Shall mean a device for controlling the flow of gas by opening or closing a passage.

Sec. 219. **Weight Belt:** Shall mean a long flexible strap with appropriate means of fastening around the waist and to which ballast is attached.

ARTICLE IV

Requirements for Certification as a Scuba Diver

Sec. 301. **Qualifications.** The diver shall participate in a scuba diving course by having satisfied the following requirements:

- (a) (1) Have completed a medical history form approved by the Director;
- (2) If the diver is 40 years of age or older, or if the diver's completed medical history form reveals a condition which might be hazardous to the health and safety of the diver when scuba diving, then the diver must be found physically fit to scuba dive by a physician whose examination included the diver's ears and sinuses: respiratory system; and cardiovascular system.
- (3) The requirements of subsection (2) when applicable shall be completed prior to the use of scuba diving equipment.
- (b) Demonstrated the ability to swim continuously for 200 yards without swimming aids; swim 50 feet underwater without swimming aids; swim 50 yards towing another person without swimming aids; float and/or tread water with minimal movement for 10 minutes; and tread water with legs only for 20 seconds.
- (c) Fulfillment of swimming requirements in accordance with Sec. 301 (b) is recommended prior to enrollment in a scuba diving course and mandatory prior to commencement of scuba training in the open water in said course.

Sec. 302. **Classroom and Water Training.** The diver shall have received and satisfactorily completed eighteen (18) hours of combined classroom and water training. This water training may be conducted in a pool or other water

which is confined or protected. The ratio of students to instructor during this water training shall not have exceeded 12 to 1. The training shall have consisted of the following:

- (a) Instruction from a certified instructor of scuba diving on the use, preventive maintenance, and care of scuba diving equipment, laws of physics relating to scuba diving; physiology with emphasis on the lungs, circulatory system, ears, and sinuses; medical-psychological problems related to scuba diving resulting from effects of pressure, breathing compressed air, carbon dioxide build-up, hyperventilation, physical fitness, exposure, temperature, and carotid sinus reflex; marine hazards; orientation to first aid, mouth-to-mouth and cardiopulmonary resuscitation; Navy Decompression Tables and repetitive diving; recommended diving practices including the buddy system, communications, diver's logbook, emergency procedures, accident reporting, dive plan, procedures for surf and boat, and nutrition; ecology; oceanography; laws or ordinances associated with the sport; and information sources for continuing education in scuba diving.
- (b) Practice in water with a certified instructor of scuba diving in the use of mask, fins, and snorkel; use of personal flotation devices; surface dives; water entries; use of weight belts; use of scuba diving equipment under normal and emergency diving conditions; and buddy breathing.

Sec. 303. **Open Water Training.** The diver shall have received and satisfactorily completed nine (9) hours of open water training with a certified instructor of scuba diving. No more than six (6) hours of open water training shall have been received during any one day. This training shall have been received where the ratio of students to instructor did not exceed 8 to 1 when using scuba diving equipment nor 12 to 1 when using skin diving equipment. The training shall have consisted of practice entries and exits from shore or boat or both, with and without scuba diving equipment; use of mask, fins, and snorkel; descent and ascent with and without scuba diving equipment; buoyancy control on and beneath the surface; swimming beneath the water with and without scuba equipment, in and around aquatic plants, clearing the mask and regulator; activating, where applicable, a reserve mechanism, monitoring a submersible pressure gauge; buddy breathing; emergency swimming ascent; buddy teamwork; swimming in surf or rough water with and without scuba equipment; and use of the safety whistle.

Sec. 304. **Dives to Be Performed During Open Water Training.** The diver shall have made, and satisfactorily completed one skin dive from shore, which shall have included surf or rough water training in the presence of a certified instructor of scuba diving. The diver shall also have made and satisfactorily completed two dives with scuba equipment, one of which shall be from shore, and one of which may be from shore or a vessel, in the presence of a certified instructor of scuba diving. Credit for no more than two (2) scuba dives shall be given within any one day.

Sec. 305. **Completion of Written Examination.** The diver shall have taken a written examination on scuba diving and received a grade of no less than 70%, which shall reflect thorough understanding of diving physics, diving physiology, and diving emergency procedures.

Sec. 306. **Completion of Performance Examination.** The diver shall transport himself and his gear 400 yards in water.

Sec. 307. **Physically Handicapped Divers.** If an individual cannot comply with the requirements of Section 301 (b) due to a physical handicap, the requirements may be waived if the individual can demonstrate sufficient watermanship to the satisfaction of a certified instructor of scuba diving.

ARTICLE V

Requirements for Recertification As A Scuba Diver

Sec. 401. **Emergency Recertification.** All persons certified as scuba divers on the effective date of this Ordinance shall be required to obtain recertification from a recognized certifying organization by July 1, 1975. A certified scuba diver who fails to obtain the recertification required by this Section shall not scuba dive except in the manner provided for by Sec. 101(c) of this Ordinance.

Sec. 402. **Emergency Recertification Requirements.** Shall be the same as the periodic recertification requirements of Sec. 404(a), (b), (c), and (d) of this Ordinance.

Sec. 403. **Periodic Recertification.** Every scuba diver who is certified or recertified by a recognized certifying organization following the effective date of this Ordinance shall obtain recertification from a recognized certifying organization every two years from the date of the preceding certification or recertification. A certified scuba diver who fails to obtain the periodic recertification required by this Section shall not scuba dive except in the manner provided by Sec. 101(c) of this Ordinance.

Sec. 404. Recertification Requirements.

- (a) The diver shall have been found to be physically fit to scuba dive in the manner provided by Section 301(a) of this Ordinance.
- (b) The diver shall have demonstrated in water, to the satisfaction of a certified instructor of scuba diving, who is present, the skills set forth in Section 302(b) of this Ordinance. The diver shall also have demonstrated to the satisfaction of a certified instructor of scuba diving, familiarization in mouth-to-mouth and cardio-pulmonary resuscitation.
- (c) The diver shall have demonstrated in open water, to the satisfaction of a certified instructor of scuba diving, who is present, the diver's proficiency in the use of scuba diving equipment and safe practices in the use of said equipment by entrances and exits from shore or boat or both; descent and ascent beneath the surface of the water; buoyancy control on or beneath the surface of the water; swimming beneath the surface of the water, clearing of mask and regulator; monitoring of a submersible pressure gauge; buddy breathing; emergency swimming ascent; buddy teamwork; swimming in and around aquatic plants; swimming in surf or rough water on and beneath the surface of the water; and any other exercises requested by the instructor that serve as reasonable indicators of proficiency and safe practices. The certified instructor of scuba diving is required to carefully screen all scuba divers before open water diving to insure that diving safety practices have been adequately explained to them.
- (d) In lieu of the requirements of Sub-Sections (b) and (c), the diver shall produce a diving log documenting a minimum of twelve (12) open water scuba dives during the preceding twelve months with a witnessing signature for each recorded dive.

ARTICLE VI

Requirements For Certification As Instructor of Scuba Diving

Sec. 501. Qualifications. The instructor shall have qualified for certification in a course of instruction on the teaching of scuba diving that provides the training and testing specified by Sections 502 and 503 of this Ordinance by having satisfied the following requirements:

- (a) Possess current training in first aid, life saving, cardio-pulmonary resuscitation, and current scuba certification.
- (b) Found to be physically fit to scuba dive by a physician whose opinion is based upon a physical examination of the diver that has included an examination of the diver's ears and sinuses; respiratory system; and cardiovascular system.
- (c) Demonstrated the ability to swim three hundred (300) yards, demonstrating at least two strokes in good form; be able to demonstrate 10-minute surface survival techniques; back floating; treading water, bobbing drownproofing (survival floating); swim twenty-five (25) yards underwater with one breath and no push-off; scuba dive in open water; use and perform preventive maintenance on scuba diving equipment; and use recognized safety procedures associated with scuba diving.

Sec. 502. Training. The instructor shall have received and satisfactorily completed a total of 100 hours of training from a recognized certifying organization during which the following instruction shall have been received by both lecture and practical work, including water work; watermanship in pool and open water; classroom teaching presentations; practical teaching presentation; teaching theory, methods, techniques, evaluation, and aids; diving environment; medical aspects of scuba diving; decompression and repetitive diving; diving physics; scuba diving course operations and procedures; emergency procedures and open-water diving; diving physiology; diving physical fitness; diving first aid; diving lifesaving; legal aspects of diving instruction; advanced and specialty-diving orientation concerning subjects such as, but not necessarily limited to, skin diving, underwater navigation, deep diving, and air consumption; and a written examination of the training received.

Sec. 503. Completion of Written Examination. The instructor shall have taken and satisfactorily passed written examinations covering the instruction received. The content of the written examination shall have been prepared by a recognized certifying organization and the determination of satisfactory completion shall be made by or under the supervision of a certified instructor of scuba diving.

ARTICLE VII

Sec. 601. Emergency Recertification. All persons certified as instructors of scuba diving on the effective date of this Ordinance shall be required to obtain recertification by March 1, 1975. An instructor who fails to obtain the recertification required by this Section shall not instruct scuba diving until he complies with the requirements of Article VI of this Ordinance for certification as an instructor of scuba diving.

Sec. 602. Emergency Recertification Requirements.

- (a) The instructor shall have been found to be physically fit in the manner provided by Section 501(b) of this Ordinance.
- (b) The instructor shall have demonstrated in water to the satisfaction of a recognized certifying organization the scuba skills set forth in Section 501(c) of this Ordinance. The instructor shall also have demonstrated to the satisfaction of a recognized certifying organization proficiency in mouth-to-mouth and cardio-pulmonary resuscitation.
- (c) The instructor shall have demonstrated in open water to the satisfaction of a recognized certifying organization, the instructor's proficiency in the use of scuba diving equipment and safe practices in the use of said equipment, by water entrances and exits from shore or boat or both; descent and ascent beneath the surface of the water; buoyancy control on or beneath the surface of the water; swimming beneath the surface of the water; clearing of mask and regulator; monitoring of a submersible pressure gauge; buddy breathing; emergency swimming ascent; buddy teamwork; swimming in and around aquatic plants; swimming in surf or rough water on and beneath the surface of the water; and any other exercises requested by the instructor that serve as reasonable indicators of proficiency and safe practices.
- (d) The instructor shall have taught two (2) classes with an overall total of not less than ten (10) students in a certification program of a recognized certifying organization within a period of twelve months from the date of issuance of the preceding certification or recertification.
- (e) The instructor shall have current training in lifesaving and first aid or attended one professional water-work session and one professional safety seminar.
- (f) The instructor shall demonstrate to the satisfaction of the recognized certifying organization that he has met the requirements for certification as an instructor of scuba diving as set forth in Article VI of this Ordinance.
- (g) In lieu of the requirements of Sub-Sections (b) and (c), the instructor of scuba diving shall produce a diving log documenting a minimum of twenty-four (24) open-water dives during the preceding twelve (12) months with a witnessing signature for each recorded dive.

Sec. 603. Periodic Recertification. Every instructor of scuba diving who is certified or recertified by a recognized certifying organization following the effective date of this Ordinance shall obtain an annual recertification from a recognized certifying organization every 12 months from the date of issuance of the preceding certification or recertification. A certified instructor of scuba diving who fails to obtain the periodic recertification required by this section shall not instruct scuba diving until he can demonstrate to the satisfaction of the recognized certifying organization that the instructor possesses the required knowledge and proficiency necessary to instruct scuba diving.

Sec. 604. Periodic Recertification Requirements.

- (a) The instructor shall have taught three classes with an overall total of not less than fifteen (15) students in a certification program of a recognized certifying organization within a period of twelve months from the date of issuance of the preceding certification or recertification.
- (b) The instructor shall have current training in lifesaving and first aid or attended one professional water-work session and one professional safety seminar.
- (c) The instructor shall have been found to be physically fit to scuba dive in the manner provided by Section 501(b) of this Ordinance.
- (d) The instructor of scuba diving shall produce a diving log documenting twenty-four (24) open-water scuba dives during the preceding twelve months. A witnessing signature is required for all dives.

ARTICLE VIII

Sec. 701. Compressed Air. Shall meet the following commodity specifications for air of the Compressed Gas Association Commodity Specification G-7-1 — 1973:

- (a) **Oxygen Content.** Not less than 19.5% nor more than 23.5%
- (b) **Carbon Dioxide Content.** Shall not exceed 1,000 parts per million.
- (c) **Carbon Monoxide Content.** Shall not exceed 20 parts per million and shall not have a pronounced odor.
- (d) **Condensed Hydrocarbons.** Shall not exceed 5 milligrams per cubic meter.

In addition, the dew point of the air shall not exceed minus 50 degrees Fahrenheit, equivalent to 70 parts per million.

ARTICLE IX

Requirements For Vessels Operated For Hire As A Base of Operations For Scuba Diving.

Sec. 801. **Certification Check.** Every scuba diver shall be required to display before boarding the vessel, a credential issued by a recognized certifying organization attesting to the diver's current certification or recertification as a scuba diver or instructor of scuba diving. This section shall not preclude an individual who is a student in a scuba diving course of a recognized certifying organization from boarding and using the vessel as a base of operations for scuba diving when accompanied by a certified instructor of scuba diving.

Sec. 802. **Required Emergency Equipment.** Within thirty (30) days from the effective date of this Ordinance the vessel shall be equipped with emergency equipment including an oxygen resuscitative unit; first aid kit; flotation device for quickly reaching and aiding a distressed diver; a recall system capable of being heard or seen by scuba divers under and on the surface of the water; and a marker buoy.

Sec. 803. **Trained Operator For Emergency Equipment.** Within thirty (30) days from the effective date of this Ordinance the vessel shall carry personnel trained in the use of the emergency equipment described in Section 802.

Sec. 804. **Roster of Scuba Divers.** A roster of all scuba divers and passengers using the vessel as a base of operations for scuba diving shall be kept aboard the vessel during the voyage. The roster shall be displayed upon demand by a peace officer. In the event of a fatality or injury requiring evacuation of a scuba diver while diving, a manifest of all passenger's names, addresses, and telephone numbers shall be obtained prior to disembarkment of passengers.

Sec. 805. **Isolation of Diving Equipment.** In the event of a fatality or injury requiring evacuation of a scuba diver while using the vessel as a base of operations for scuba diving, the operator of the vessel shall attempt to secure possession of all scuba equipment separated from the diver and isolate the separated equipment from access to persons other than a peace officer investigating the fatality or injury. Possession of the separated equipment shall be delivered only to a peace officer.

ARTICLE X

Performance Standards For Scuba Diving Equipment

Sec. 901. **Regulators.** Shall comply with the following standards:

- Have a minimal inhalation resistance not to exceed three (3) inches of water pressure at normal respiration rates at 1 atmosphere absolute pressure in air.
- Not leak water upon inhalation or exhalation.
- Not have an intermediate pressure hose with cuts or abrasions extending through the hose reinforcing braid.
- Not contain rubber components with cracks, deterioration (gumminess), abrasions, cuts, or holes that affect the structural integrity of the parts.
- If equipped with an integral reserve mechanism, shall warn the diver that his air supply is low at a cylinder pressure of 250 p.s.i.g. minimum.

Sec. 902. **Valves.** Shall comply with the following standards:

- Not have a seal to the regulator that will leak air when the regulator is properly attached to the valve and maximum-rated cylinder pressure is applied to the connection.
- If equipped with a reserve mechanism (J-valve), shall have a noticeable restriction to breathing or other suitable means to warn the diver that he has reached his reserve level. Pressure at which this function becomes noticeable shall be a minimum of 250 p.s.i.g. Units which use flow restriction as the warning mechanism shall remove said restriction upon release of the reserve by the diver.

Sec. 903. **Cylinders.** Shall comply with the following standards:

- Be within its hydrostatic test interval as specified by the United States Department of Transportation.
- Within sixty (60) days from the effective date of this Ordinance be visually inspected annually to assure freedom from excessive rust, loose scale, or moisture.
- Units within the annual visual inspection period which have evidence of loose corrosion products or water within the cylinder shall be uninspected prior to refilling.

Sec. 904. **Submersible Pressure Gauges.** Shall comply with the following standards:

- Be within 5% accuracy of full scale over the entire gauge range.
- Be equipped with a means of relieving internal case pressure without explosively ejecting the gauge lens or bursting the case.
- Not have a pressure hose with cuts or abrasions extending to the hose reinforcing braid and not leak air through the braid.

Sec. 905. **Weight Belt.** Shall comply with the following standards:

- Have an attachment mechanism that will securely remain fastened under a minimum tensile load of 20 pounds.
- Be releaseable by the diver upon actuation of the release mechanism with either hand.

Sec. 906. **Flotation Equipment.** Shall comply with the following standards:

- Be airtight and capable of holding a pressure of two p.s.i. minimum with relief valves blocked.
- Possess a minimum buoyancy of 15 pounds when fully inflated at the surface.
- Have a means by which it must be attached to the diver and be capable of supporting the buoyancy load of a fully inflated unit.
- Be equipped with an over-pressure valve capable of relieving a fully inflated unit when released by itself from 33 feet without sustaining structural damage to the unit. This shall apply to a unit that can be inflated by means other than a compressed gas cartridge.
- Not be used with compressed gas cartridges with capacities greater than those recommended by the manufacturers unless equipped with an over-pressure mechanism.
- Be maintained in a clean, operable condition, whether oral, compressed gas, high pressure, bottle fed or scuba-cylinder fed.
- Not contain components with cracks, deterioration, abrasions, cuts, or holes that affect the structural integrity of the unit.

Section 2. Chapter XXIII of Ordinance No. 5860, entitled the "License Ordinance," adopted November 27, 1951, is repealed.

Section 3. **Declaration of Urgency.** Safe scuba diving requires that users of self-contained underwater breathing apparatus be physically capable of diving, receive instruction in the use of the equipment from a qualified instructor, and maintain proficiency through scuba diving; that air furnished for use in scuba diving meet specific standards for air purity; that equipment furnished for use in scuba diving meet specific performance standards; and that vessels being used as bases of operation for scuba diving observe specific operating procedures and carry equipment for the protection of the scuba diver. At the present time, compliance with the aforementioned requirements is voluntary. Increases in deaths of persons while scuba diving indicate that safe scuba diving cannot be assured through programs of voluntary compliance. Due to an increasing participation in scuba diving on the part of the citizens of the County of Los Angeles and an increasing use of the territorial waters of the County of Los Angeles for scuba diving, it is imperative that the public health and safety be immediately protected by the establishment of mandatory standards designed to make scuba diving safe. This Ordinance establishes such standards. By reason of the foregoing facts, this Ordinance is urgently required for the immediate preservation of the public peace, health and safety, and the same shall take effect immediately upon the passage thereof.

Section 4. This ordinance shall be published in the Metropolitan News, a newspaper printed and published in the County of Los Angeles.

KENNETH HAHN
Chairman

(SEAL)
ATTEST:
JAMES S. MIZE
Executive Officer-Clerk
of the Board of Supervisors
of the County of Los Angeles

I hereby certify that at its meeting of November 21, 1974, the foregoing ordinance was adopted by the Board of Supervisors of said County of Los Angeles by the following vote, to wit:

Ayes: Supervisors Peter F. Schabarum, James A. Hayes, Baxter Ward and Kenneth Hahn.

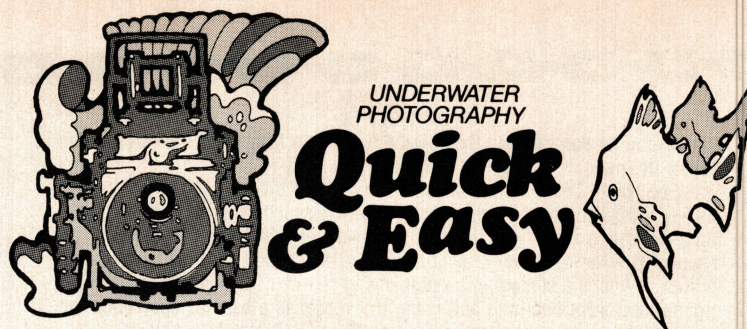
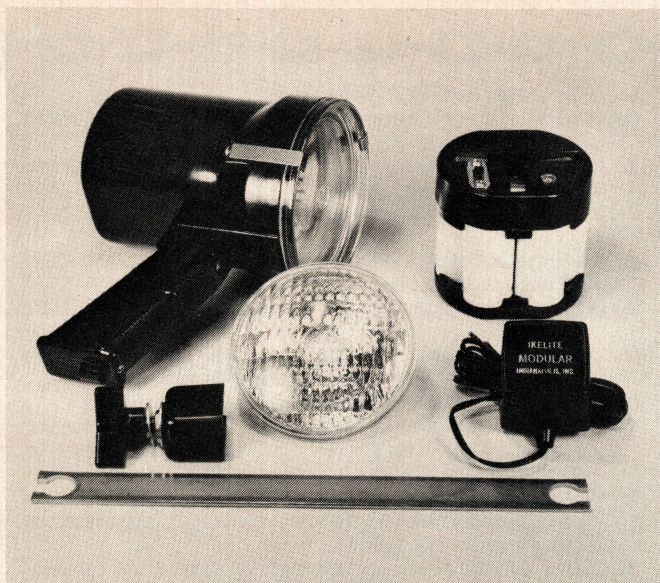
Noes: None.

(SEAL)

JAMES S. MIZE
Executive Officer-Clerk
of the Board of Supervisors
of the County of Los Angeles
By DeWitt W. Clinton

Effective date November 21, 1974

Reprinted from Metropolitan News
205 S. Broadway, 628-4384



PART L PRODUCT REPORT The Ikelite Modular Lighting System

By Jim and Cathy Church

You name it—diving light, focusing light or movie light—the Ikelite Modular Lighting System will do the job. The heart of this system is the Ikelite Modular Super Light #1085. This light consists of a molded body and dome-port lid, interchangeable #1084 nickel-cadmium battery module, GE #4308 six volt headlamp, detachable handle and Ikelite #1083 battery charger. The body shell is available in either black or transparent GE Lexan. While the black may be more eye-appealing, the transparent body provides a visible check of O ring seal.

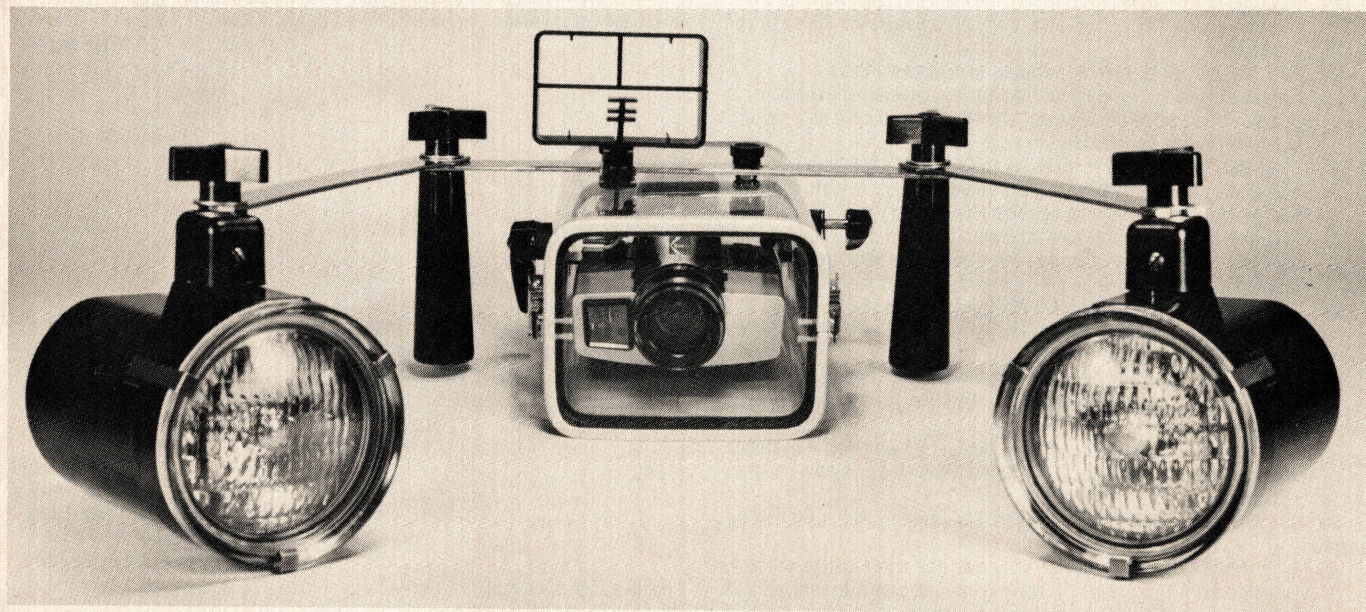
The Modular Super Light is a superb diving light, one of the brightest we've seen. The three-position hi/off/low

switch and safety lock are both easily operated with cold or gloved fingers. The dual-filament bulb gives almost a full hour of light in the high-powered spotlight mode from a fully charged battery, and about two hours at the lower-powered floodlight setting.

No special tools are required for recharging batteries or changing lamps. To open the light, simply press the three spring-steel clips outward with thumb pressure to release the dome-port lid. Lift the lid out of place and tilt the body so the sealed-beam lamp falls gently into the palm of your hand. The top of the battery module will now be exposed, and directions for charging and changing

lamps are molded on its upper surface. Recharging time is normally about 15 hours, and the battery module does not have to be removed from the body of the light. The standard #1083 charging unit plugs into any 110 volt household outlet. An accessory charger, #1082, plugs into any 12 volt cigarette lighter receptacle.

For still photographers, the Modular Super Light, with a bracket and mounting bar replacing the detachable handle, can be attached to almost any Ikelite camera housing. With the popular SLR case, the mounting bar can be attached to either the handle unit or bolted to the base plate of the housing. With other Ikelite housings, the mounting bar of the light re-



places the mounting bar of the handle unit supplied with the housing. For Nikonos camera users, the Super Light can be attached to either the Ikelite #4015 Nikonos Handle Unit or the #4014 Nikonos Short Tray. In each of these cases, additional mounting bars for Ikelite strobe housings can usually be secured with the same bracket which secures the Super Light in place.

Attaching the Super Light to the camera housing provides three important advantages: (1) A camera and diving light that are a "single unit" will be easier to handle than a separate camera and light. (2) Illuminating subjects with the Super Light makes focusing easier with reflex viewing systems. (3) For night U/W photography, the camera can be aimed with the beam of light from the Super Light. In each of these situations, the purpose of the diving light is to help spot subjects, focus or aim the camera. The primary light for the exposure would be from available light, flashbulb or strobe.

For U/W cinematography, the #1086 Movie Light Conversion Kit is used to convert the Modular Super Light into a Modular Movie Light. This kit consists of a GE sealed-beam, 100 watt/six volt, cinema lamp and the necessary bracket and mounting bar to attach the light to any Ikelite movie housing. The cinema lamp is similar in size and appearance to the diving light lamp, and these lamps can be interchanged in less than one minute. Simply remove the diving light lamp, set the switch on the battery module to the "movie light" position, insert the cinema lamp and replace the lid.

The Modular Movie Lamp gives about 12 minutes of high intensity, 3400 degree K light from a fully charged nickel-cadmium battery module. This is enough to expose three cartridges of Super 8 film with power to spare. We tested battery life by submerging a Modular Movie Light in a pan of 60 degree water (for cooling) and turning it on and off at 30 second intervals. After every sixth time the light was turned off, it was left off for five minutes. The battery gave about 14 minutes of light, and there was no sign of overheating when the light was opened for inspection. For extended trips, however, we recommend having one or more spare battery modules. Changing modules is easy. After removing the lid and lamp (as previously described), turn the

body of the light face downward and rap it gently against the palm of your hand. The battery module will slide out of place easily.

Because of the domed lid, the beam angle of the Modular Movie Light (as well as the Super Light) is virtually the same underwater as in air. Therefore, adequate lighting coverage is provided for most standard lenses. With wide-angle lenses, a pair of Modular Movie Lights can be used to illuminate the left and right sides of the U/W picture area.

Whenever the Modular Movie Light provides the main light for exposures with Type A Color Movie Film, as with close-ups, set the selector switch of the camera for the artificial light position. At longer distances, when available light is the primary light source, set the selector for the daylight position. After taking and projecting a few rolls, you will soon decide which position of the switch gives the results you want.

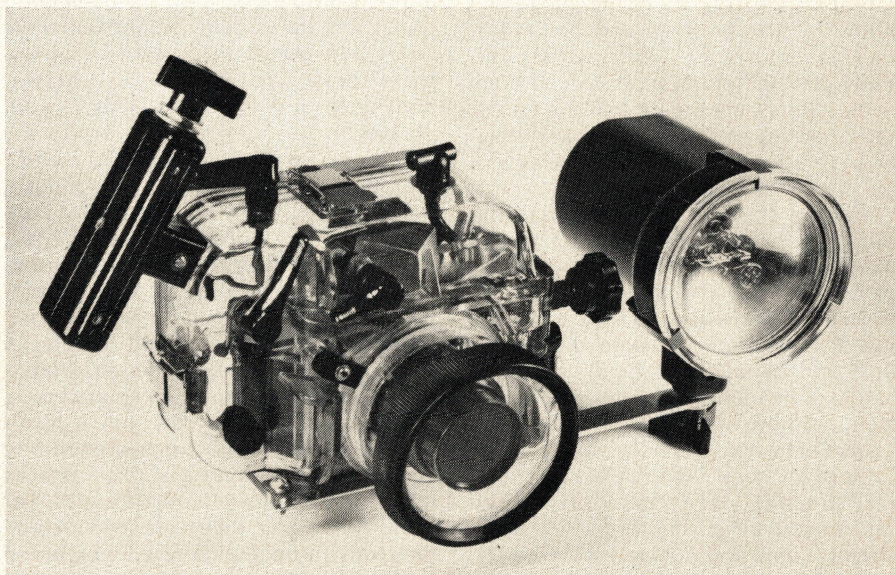
With the detachable handle replacing the mounting bar and bracket, the Modular Movie Light can sometimes be handheld by another diver to enhance your U/W movies. For example, scenes which show divers carrying diving lights are often more dynamic when the diving lights have intense beams. Therefore, using the cinema lamp in place of the diving light lamp may improve these

scenes. This is especially true when you are filming in bright conditions or with upward camera angles. In addition, a movie light held by another diver can be used to side or back light subjects.

The Modular Movie Light can be used as a fill light for available light photography with still cameras. With daylight color film, the color balance between the cinema lamp and film is incorrect, but the fill light can warm and brighten medium and long distance shots. Close-ups would require either filters for daylight film, or tungsten film designed for use with floodlights. Usually, the best approach is to use daylight color film and strobe if artificial lighting is needed.

Ikelite has two other modular diving lights which utilize the same body shell as the Modular Super Light. These are Modular I (#1080) and Modular X (#1081). Modular I uses the same lamp as the Modular Super Light, but is powered by six regular size D batteries. It can be converted to a Super Light by installing the nickel-cadmium battery pack. Modular X uses a different bulb and requires six of the higher priced alkaline D cells. It can be converted to a Super Light by changing the bulb and batteries. For more information about Ikelite Modular Lighting Systems, send one dollar for a catalog to: Ikelite, 3303 North Illinois Street, Indianapolis, Indiana 46208. ➤

photography by Authors



FINAL CALL CALIFOR

MARCH 22 ANAHEIM, CALIFORNIA

It's nearly curtain time for the greatest underwater show on earth — a show that will be the social event of the season! You'll be able to meet new celebrities in diving, rub elbows with some of the famous ones and renew old diving acquaintances. Over 4000 people are expected to jam the huge Anaheim convention center for California Underwater Exposition '75, an action packed afternoon of special California films and slides, and an evening film festival of worldwide interest. All of the presentations are grabbers. There will be everything from a shark attack in slow motion to an angel-fish growing up. You'll watch divers cut through to the inside of the *Adrea Doria*, and you'll see them explore for the first time an undersea lava siphon that connects the open ocean to an island lake.

The afternoon attraction of California Underwater Expo '75 is a specially planned "all-California" show, something that no California diver will want to miss. Bob Evans, whose work has been widely published in numerous books and magazines, will be on hand with a selection of his finest slides of life above and below the sea, in and around the California Channel Islands. Evans, who is currently photographing for a special book on the islands, has breathtaking material: seals, battling sea lions, birds, underwater seascapes, and panoramic views of the islands themselves.

Also on the afternoon show is Jim Lindsey, who will present a film by Frank Harris on one of California's best underwater offerings, the spiny lobster. The film will show where to look for them, how to grab them, how to distinguish male and female, size limits, age, and there will be biological notes on the bug itself and how it stands as a resource.

Jim Dunn and Dan Chambers, of the California Wreck Divers (SDM Dec '74), will present slides on well-known California wrecks, such as the *Olympic*, *Valiant*, *Tioga* and *Butler*. You'll see underwater pictures of ships, hear of their history, romance and lore, and you'll see the rewards of diving on such wrecks, i.e.: artifacts. Tips on restoration of ar-

tifacts will be given, and you'll see "before and after" photos which will show you how great the rewards of a good underwater eye can be!

Underwater photography, a hobby rapidly growing in popularity with many divers in California and everywhere else, will be on the afternoon program. Author/photographer Emerson Mulford will be there to explain the hows and whys of taking pictures underwater, and he will tell you how to get good photos. Subjects he'll talk about will include: wide-angle photography of people and wrecks, close-ups, macrophotography, different types of films and cameras. This is a nuts and bolts presentation; so you won't want to miss it! There will be a five minute question and answer period after each of the four presentations.

The "all-California" afternoon program is on from 2:30 to 5:30. Then there will be time for everyone to view the many displays in the big exhibition hall at the center. This is the chance for you to preview the latest in diving equipment, from snorkels to electronics, and to view artifacts brought up from the ocean bottom. Everyone working on and under the sea will be there: divers, writers, photographers, publishers, scientists, aquanauts and inventors. This is your chance to see your friends and to see others you've always wanted to meet!

The evening film festival, beginning at 7:30 p.m., will be emceed by SDM Publisher Paul Tzimoulis, and there will be a lineup of noted personalities and exciting films. *Sea of Eden*, by Al Giddings, will be premiered. This dazzling film is a panoramic view of the island complex of Palau, above and below the sea. Underwater cameras zoom in on spotted rays, cowries, undersea grottos, jellyfish, divers handfeeding moray eels, exploring caves, and penetrating sunken wrecks full of bombs and other explosives. For the first time ever, divers are seen inching their way through a narrow, unexplored underwater lava siphon that extends from open ocean to inside island lake.

Drs. Don Nelson and Richard Johnson, who for two years studied dangerous

sharks in Rangiroa, captured some heart-stopping footage of sharks about to attack divers and cameras. You'll see the resulting film, *Survival Among Sharks*, which shows an attack in slow motion so that attack postures are easily identified. Divers have often wondered what to do should a shark zero in. This film will offer a few extremely handy tips!

Assault on the Doria, a film by Bob Hollis, will take the audience to the deep, eerie grave of the sunken luxury liner *Andrea Doria*. The film will recount the historical anchoring of a habitat to the \$60 million ship, where the divers lived while they worked to cut through to the treasures inside.

Fish Antics, by Jack McKenney, is a lively underwater motion picture portrait of fish in action — how they look, how they act, and how they survive. His camera focuses on the private lives of fishes found in the Caribbean, the Bahamas and off Australia, and the subject matter ranges from a night time shark feeding sequence to two Spanish hogfish battling over territorial rights.

An Angelfish, by Jim Dutcher, is an entirely different approach. It traces the life and growth of one individual French angel, from a tiny one-inch speck on the reef through its adult life as a graceful, large fish. Dutcher's wife, Renate, is the diver who goes down regularly to visit the fish, and through her eyes we see the changes and experience the tenseness she feels when a violent storm churns up the sea where the angelfish lives.

Sea Creatures, a film by the talented Robin Lehman, is a close-up look at various forms of subsea life. The marine oddities captured by Lehman's lens are fascinating to watch, and CUE festival goers needn't get wet to do it!

That's the lineup of California Underwater Expo '75 — exploration, adventure and action! Tickets are going fast, so hurry. This is the final call for the one show you don't want to miss! One price, \$6, admits you to everything. Write: California Underwater Expositions, Box 10931, Santa Ana, Calif. 92711, or call (714) 675-4350. See you there! ➤

NIA U/W EXPOSITION '75

BE THERE!

Bob Evans



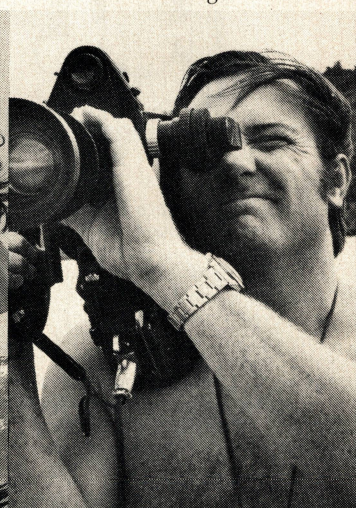
Paul J. Tzimoulis



Jack McKenney

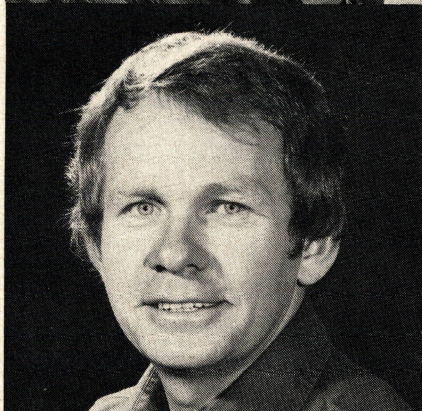


Al Giddings

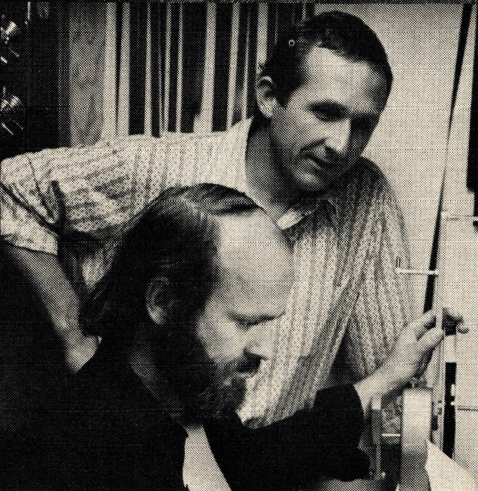


Emerson Mulford

Bob Hollis



Dan Chambers

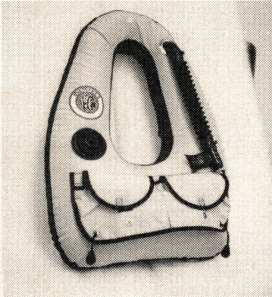


Frank Harris/Jim Lindsey



Jim Dutcher

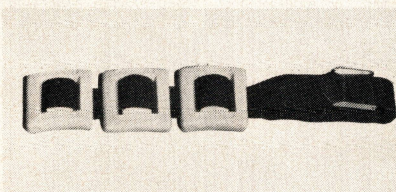
Seatec's new Buoyancy Compensator Vest has a total 3-D design and features removable inner bladder of heavy urethane material (outer bag of urethane-coated heavy nylon). It has oral inflator with purge mouthpiece, automatic over pressure valve, two pockets, and can accommodate CO² cartridges or two pressure inflation systems, or both. \$80. Contact: Seatec, 425 W. Palmyra, Orange, California 92666.



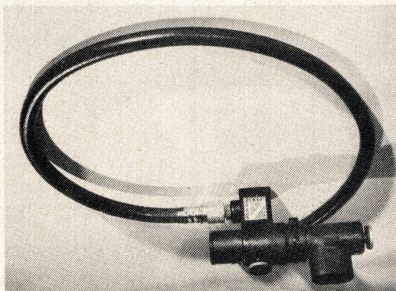
Harvey's Exposure Suit was designed to be worn over clothing in preparedness for emergency use in extreme cold weather or water conditions. When the zippers are closed, it is ready for emergency use; when the zippers are open, it fits loosely and comfortably. The suit is made of eighth inch neoprene with nylon on both sides, and is priced from \$175. Contact: Harvey's, 11011 First Ave. S., Seattle, Wash. 98168.



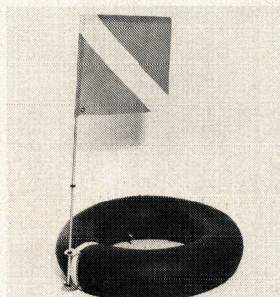
To prevent possible slippage, U.S. Divers Co. offers a newly designed belt buckle this year on all of its back packs and weight belts. The cam action buckle is constructed of stainless steel, and features larger teeth to grasp better, and a new enlarged opening for easier donning with two inch wide nylon belts. Buckle alone is \$3.50. Contact: U.S. Divers Co., 3323 W. Warner Ave., Santa Ana, Calif. 92702.



New Gear



A new Low Pressure Inflator has been designed by White Stag to be used with most buoyancy compensators with a large hose and over-pressure valve. The body of the Low Pressure Inflator is made of durable fiberglass filled polypropylene. The hose connector device works easily and quickly. Catalog No. 53970. The retail price is \$40. Contact: White Stag Water Sports, 1046 Princeton Drive, Marina Del Rey, Calif. 90291.

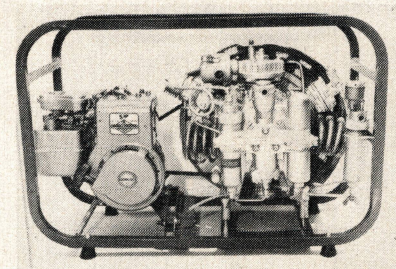


A divers flag is an important piece of safety gear in any water, and U.S. Divers has a new flag and holder which will attach to any sized innertube. Signifying "diver below," this international flag is 13 X 16 inch nylon and comes with a flexible stiffener to keep it unfurled and visible. Holder and staff is of aluminum. \$9.95. Contact: U.S. Divers Co., 3323 West Warner, Santa Ana, Calif. 92702.

White Stag's new Super Lince mask has been redesigned to provide a universal fit with improved vision, particularly downward. Other features of the Super Lince include a double seal to prevent water leakage, low volume for ease of diving, molded strap for best fit and extreme lightness for extra comfort. Price is \$14. Contact: White Stag Water Sports, 1046 Princeton Drive, Marina Del Rey, California 90291.



Diving clubs, councils or boat owners who like to get away from the beaten kelp should look into Mako's portable KA-51-GF compressor. This 38 X 17 X 24 inch compressor weighs only 185 pounds, and can give five CFM up to 3200 or 5000 psi. It can be powered with gas, electric or diesel fuel, and is easy to maintain. Priced from \$1850. Contact: Mako, 3131 N.E. 118 St., North Miami Beach, Florida 33160.



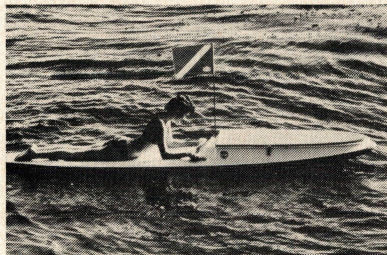
If your watch band is always too short to fit over your wet suit or so long you trip over it on dry land, then Aqua-Craft has something new and wonderful for you; a watch band made of Velcro, the "magic fastener." The bands are available in widths to fit either men's or women's watches, and in color choice of black, blue or orange for \$1.25 each. Contact: Aqua-Craft, 3280 Kurtz, San Diego, Calif. 92110.



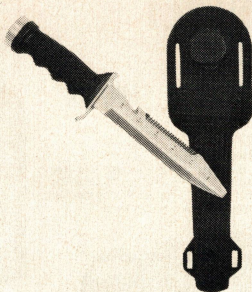
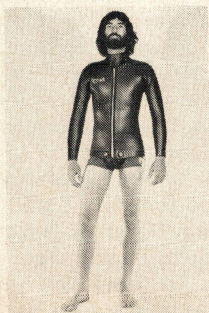
Dacor's UL800 rechargeable U/W light is the compact answer for night, wreck or cave diving needs. It gives two hours of useable light, providing initial 100,000 candle-power from new 6.4 volt electrogel battery. Recharges in 10 to 12 hours. It has strong Cycloc body and rim, floats sealed beam up, and operates to depths of 700 feet. \$49.50 Contact: Dacor Corp., 161 Northfield Rd., Northfield, Ill. 60093.



The Explorer II Scuba Board from Fiber-Craft Concepts, features a 12 by 17 inch plexiglass ocean window for underwater viewing. The 80 pound board has a 3.5 cubic foot watertight storage compartment, anchor tie points fore and aft, carrying handles and all-around neoprene bumper. Construction is fiberglass with foam interior. \$249. Contact: Fiber-Craft, 14233 Oxnard Street, Van Nuys, California 91401.



To reduce water entry around the neck, the O'Neill Otter Jacket features an adjustable mandarine collar with Velcro lock. The YKK self-lubricative zipper has teflon teeth with a stainless runner, preventing stickiness or corrosion. The jacket sells for \$74.95 in quarter inch neoprene with nylon on one side; \$94.95 in quarter inch nylon two. Contact: O'Neill Inc., 1071 Forty-First Ave., Santa Cruz, Calif. 95060.



Dacor's model DKT knife features a blunt working tip, two sharp saw tooth segments, hollow ground line cutter and stainless steel guard. It has a contour grip, rubber handle and rubber sheath with depth compensating rubber sheath straps. Blade and shank of stainless steel/carbon steel alloy combines best features of both metals. Priced at \$24. Contact: Dacor Corp., 161 Northfield Rd., Northfield, Ill. 60093.

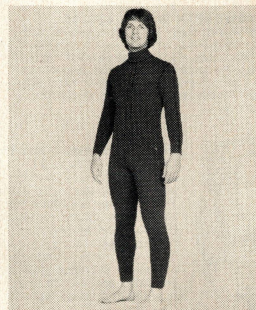


The Capsule Depth Gauge is another advance in diving instrumentation from Scubapro. The oil-filled sealed capsule depth gauge features a temperature compensating "sealed in" diaphragm which maximizes accuracy from 32 degrees to 90 degrees Fahrenheit. Unit is mounted in a stainless steel case with a contoured rubber base. Price is \$40. Contact: Scubapro, 3105 E. Harcourt, Compton, California 90221.

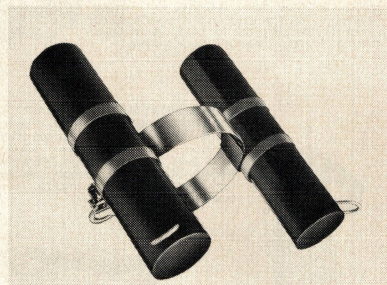


The O'Neill Ring Jacket and Seal Hood employs a skirt around the face to maximize protection and minimize water exchange. The hood is available in two styles: the Ring Jacket Hood, for standard full zipper jackets quarter inch, at \$28.95, and the Ring Seal Hood for use on the O'Neill SuperSuit and Seal Suit quarter inch, at \$20.95. Contact: O'Neill Inc., 1071 41st Avenue, Santa Cruz, California 95060.

Parkway has a new one piece jumpsuit available for '75. The suit is made of eighth inch neoprene with nylon on both sides, and features exclusive double primed and glued seams with new Parkway lock stitching. It has a high neck, fastened with Velcro for extra protection, and is available in black, orange or blue outside for \$100. Contact: Parkway, 291 New Brunswick Ave., Perth Amboy, N.J. 08861.



Scubapro's Independent Weight System puts the weights on the tank, not on the diver. Specifically designed for use with buoyancy compensating inflatables, the I.W.S. can be secured to any tank and accommodates any combination of Scubapro weights and spacers up to 30 pounds. If needed, weights can be jettisoned by activating a pull rod. \$30. Contact: Scubapro, 3105 E. Harcourt, Compton, Calif. 90221.



The Scuba-Prop is a tank-mounted propulsion unit capable of speeds up to three miles per hour. The silent battery-powered motors run about one hour per charge, to depths of 200 feet, controlled by a spring loaded hand switch (continuous on-mode optional). A safety cable releases unit from tank if needed. Priced about \$200. Contact: Shakespeare Products, 241 E. Kalamazoo Ave., Kalamazoo, Michigan.



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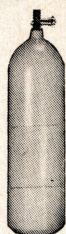
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Features break-resistant material for unequalled durability, stainless steel band, simple wing nut adjustment. Fits all standard 6.9" diameter cylinders. \$10.75 ea. in quantities of six or more.



INFLATABLE VEST \$19.95
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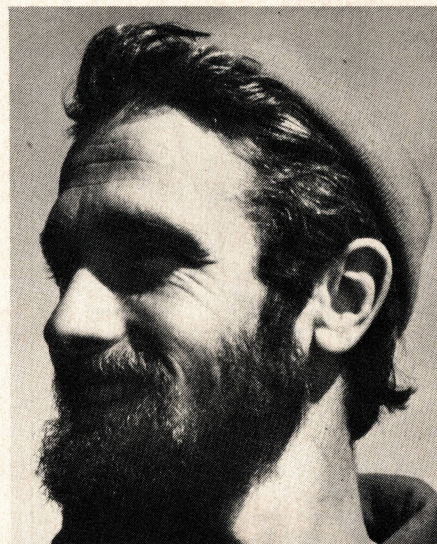


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UNDERWATER '75

Harvard University's Harvard Hall will be filled with divers April 5 when Underwater '75 presents its underwater symposium and film festival. The symposium, which will run from 11 a.m. through 5 p.m., will highlight a special series of lectures titled Diving In New England. Included in this series will be



Philippe Cousteau

Hunting New England Shipwrecks with Brad Luther, (an internationally recognized wreck authority) Underwater Archaeology in New England, Cave Diving New England Style, and New England Underwater Photography with a number of the area's leading subsea artists, including Russ Kolifrath, Lewis Lainey and Alan Budreau. Concurrently, the underwater symposium will present Deep Diving Submersibles, Commercial/Industrial Diving, In-Water Instrumentation, Diving Equipment, Marine Biology, Diving in the Military, Para-Scuba.

Beginning at 8 p.m., Fred Calhoun will emcee an evening of premier underwater films and slides. Bob Croft's *Quest* will take the audience on a hectic swirling racing ride down the Colorado River during one of the most unusual underwater motion pictures ever made, and Dean Westgaard's *Para-Scuba* will show the audience the fast paced marriage of two dangerous activities, diving and sky-diving. Continuing L'Aventure Cousteau, Fred Calhoun will present the Cousteau classic *The Unsinkable Sea Otter*. Once again Captain Cousteau and his crew have captured the unexplored in exciting sequences which could only be observed by the instinctive lens of this great oceanographer.

Tickets for Underwater '75 (\$3.50 for the symposium and \$3.50 for the film review) may be purchased at the door, or in advance by contacting: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, Massachusetts 02117. Checks should be made payable to NAUI.

GREAT PLAINS TENTH

Saturday and Sunday, March 15-16, are the days set for the Tenth Annual Great Plains Diving Council Convention. This year's convention will be held at the Ramada Inn just off Interstate 80 at Kearney, Nebraska, and will start off with an unofficial pre-convention party Friday night for old friends and new from the Council's four state area.

Saturday will get underway with registration at 8 a.m., followed by an open Council meeting. Monte Madsen, a diver with the Nebraska Game and Parks Commission Seining Crew, will be the first speaker at 10:30 a.m. Madsen works at Lake McConaughy, one of the best lakes for diving in Nebraska, and will give local divers some insight into the fish populations and the programs initiated by the Game Commission.

Jack McKenney, editor of *SKIN DIVER*, will headline the program at 1:30 p.m. with a full afternoon of films and slides. His program will include: *Deep Blue World*, *Quarry Diving*, *With Williamson Beneath the Sea*, *The Andrea Doria Caper*, *Beneath Grand Cayman Waters*, *Ten Fathoms Deep*, and his latest film *Fish Antics*. There will be a short break and cocktail hour after McKenney's presentation, then a banquet which will begin at 7 p.m. After-dinner entertainment will be furnished by the hosting Kearney Aqua Lords, and then there will be a dance until 1 a.m. Sunday there will be an unregimented get well swim.

Divers always have a great time at the Great Plains Diving Council Convention, but the 1975 event should be the most enjoyable yet! Tickets are available at \$4 for the Saturday afternoon show, or \$12.50 for the entire convention. For more information and reservations contact: Wilma Rayburn, Route 1, Kearney, Nebraska 68847. Make checks payable to the Great Plains Diving Council.

FIFTH USA PHOTO CONTEST

April 7, 1975, is the entry deadline for the Fifth Annual Underwater Society of America Photo Contest. The contest is of the elimination type; only those entries that have won in any previous competition are eligible to enter. The thought behind the elimination contest is to compete award winning photos against each other, thus allowing the entrant a chance to compare his work. The previous contest, however, need not be associated in any way with the Underwater Society of America.

Entries will be displayed and winners announced May 3 and 4 at Our World-Underwater, to be held in Chicago, Illinois. The rules and entry forms are available through your council, or by contacting: John Hall, Director of Photography, Underwater Society of America, Box 407, St. Ann, Missouri 63074.

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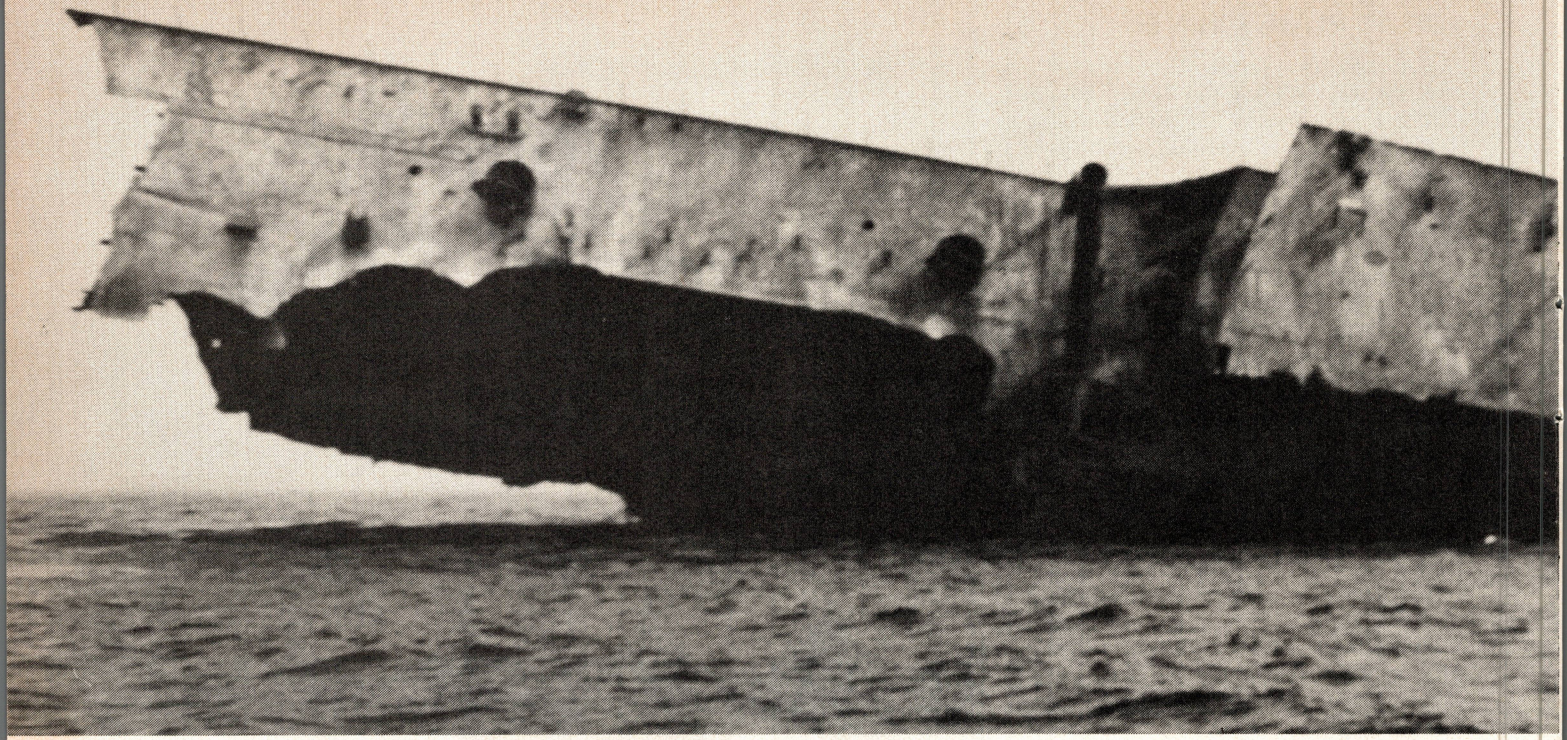
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"I scrambled to the deck after being thrown from my bunk by a terrific bump which broke the ship in half. I saw the bow of the ship, with the captain and eight men clinging to it, floating out to sea. Within a few minutes it was out of sight." Safe ashore at last, after being adrift for 14 hours on the stern half of the *SS Pendleton*, oiler Douglas Potts described the ordeal which he and his fellow crewmen had just survived.

The tanker had been bound for Boston — just a few hours from that port — when she was caught in a raging snow storm. Seas as high as 60 feet and winds up to 70 knots battered her. She struggled all night along Cape Cod's outer shore until finally, in the early morning of February 18, 1952, an enormous wave broke her back just below the mizzenmast. The skipper, three of his officers, and five other crewmen were trapped on the bow.

Potts was lucky enough to be one of the 33 men left on the aft two-thirds of the broken ship. There was protection from the waves, as well as light, heat and food in that section — all they lacked was communications. The radio was in the bow, but, unknown to the crewmen soon separated from the forward half by over a mile of boiling sea, it had been disabled before an SOS could be sent. So, the two parts of the *Pendleton* tossed and twisted in the wind with no hope of rescue.

Suddenly, the buzz of a Coast Guard plane was heard circling the area. It wasn't ESP or a routine flight that brought the pilot out on such a foul night. By incredible coincidence, a sister ship of the *Pendleton*, the *Fort Mercer*, had broken in half at almost exactly the same time about 30 miles offshore. She had managed to send out an SOS. The searching Coast Guard pilot thought he had located part of the *Mercer*, but as he flew over the bow, he could make out the name *Pendleton*!

He radioed his unusual find to the Chatham Coast Guard station and one of the most dramatic rescue operations in Massachusetts history was organized. A 36 foot open lifeboat, with Coast Guardman Bernard Webber lashed to the wheel and three other heroic guards hanging on for dear life, braved the wild seas and managed to reach the *Pendleton's* stern. As the lifeboat bobbed alongside, 350 pound Tiny Meyers handed his fellow crew members down to the lifeboat. Web-

ber recalled, "The last one was Tiny. He got on the boat, but a wave washed him off and he was crushed between the side of the tanker and the lifeboat. But that guy died a hero."

"We headed back for the shore like a horse going home, mostly by instinct," Webber continued. "It was as tough coming back as it had been going out. The tide was on the ebb and there was even less water on the bar, but thank God we made it." By 8:45 p.m. the 32 survivors were safe on dry land.

The rescue operation to the bow was not so successful. At 9 p.m. another lifeboat managed to get near the forward section. Only one lone survivor was visible. He shouted that the eight others had been lost overboard, having been swept from the deck and dropped half-frozen and helpless to deaths beneath the icy water. As the lifeboat crew struggled to get a line to the bow, a huge wave swept the deck and this last man followed his mates to a watery grave.

The next day, as the storm gradually subsided, the stern end washed ashore on Monomoy Point. Its sea career was not over, for it was joined to the bow of the *Fort Mercer*, and, in a short time, was sailing the east coast again. The bow of the *Pendleton*, however, ran aground on Pollock Rip Shoal and settled in 45 feet of water with its once proud nose in the air. There it has remained, its exposed half rusting in the Cape Cod sea air, while its submerged half has become the home of anemones, fish, lobsters and seaweed.

The bow of the *Pendleton* is only a short 15 or 20 minute boat ride from Chatham Harbor, and it is shallow enough to allow long dives with no decompression, so the wreck has become a favorite of east coast divers. When my husband, Dean, and I planned a weekend to research the dive spots off Cape Cod, therefore, the *Pendleton* was number one on our list of intended dives. Our base of operation for the weekend was the Chatham Dive-In, and we made plans with the owner, Jim Mellen, to go out on Sunday morning.

The Cape is notorious for its strong currents and variable tides, so we checked the tide tables to be sure we would be on the wreck during a slack period. We settled on 11:30 a.m. for our departure, and met Don Kenney, who was to be our captain, at Chatham Harbor as arranged. His 19 foot Boston

HAVE TWICE THE FUN ON HALF A WRECK

By Judy Gail May



photography by Author



The SS Pendleton broke in half during a violent storm in 1952. Her stern was salvaged and returned to active service, but her bow was left in shallow water off Chatham, Mass. Don Kenney took the author and her husband to the site in his Boston Whaler, where Dean is shown swimming along side of the ship looking for an opening.

Whaler was just about right for four or five divers, so we loaded our gear and headed out.

We zipped along Monomoy Island and, as we left land behind, there on the horizon loomed the rusting hulk of the *Pendleton*. We anchored just beneath her now-corroded nose, donned our gear, and went over the side to see what the submerged half looked like. We were pleasantly surprised. Beneath the surface, the wreck was pretty much intact and was covered with anemone, urchins, kelp and algae, making it look like a lush underwater garden.

The visibility was about 20 feet, but the water was full of tiny particles from the sand bottom. The tide was still going out when we went down, the rapid movement of the water giving us the advantage of quickly clearing clouds we stirred up

while looking for goodies on the bottom. Large bass, tautog and sculpin glided in and out of the wreckage, seemingly unruffled by our invasion, and tasty lobsters filled the traps which had been set on the sand next to the wreck.

We spent some time surveying the ship's exterior and meeting some of its inhabitants, then decided to take a look inside. The ship had tipped onto its starboard side, making the deck appear to be a slanted wall, so finding an opening into the ship was a bit tricky. We finally entered through a small jagged hole. We had to swim around a jagged hunk of metal, continue under it and then double back into a corridor leading aft.

Inside the *Pendleton* it was easy to get disoriented because of the tipped condition of the ship. A spanking clean black and white mosaic tile floor covered the "wall" to my left as I swam into the room at the end of the corridor. There, a sink lay on its back attached to the "floor" beneath me. A little sunlight filtered in through rips and tears on the high side of the ship, but generally the interior was very black. The way out, on the contrary, was pitch black and would have been impossible to find without lights and our bright yellow lifeline.

The real attraction of the interior of the *Pendleton* was the shiniest, brightest porthole I have ever seen underwater. It was attached to the starboard side of the ship and, therefore, lay beneath us. It was open and in such a position that water and tiny particles of abrasive sand continually washed back and forth through and over it, keeping it gleamingly clean of any marine growth. It would have been a fantastic treasure to retrieve but, since it looked so beautiful in its unique position, we left it for other divers to see.

With a final glance at the porthole, we turned and followed our lifeline back to its secured end. The tide had turned while we were inside the ship, and it moved us gently forward, making the return to the boat an effortless one. As we ascended the anchor line, we found that this dive site had one more fascinating sight for us. The water around us was teeming with hundreds of miniscule transparent jellyfish. We watched the iridescent creatures until we finally sipped the last bit of air from our tanks, then ascended, agreeing that it was "four stars" for the *Pendleton*. >»

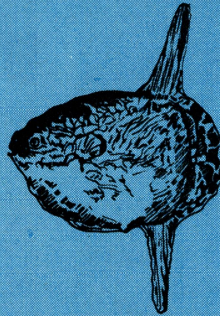


The Ocean Sunfish

(*Mola mola*)

Not many fishes are commonly known by their generic names, but "mola mola" is a universal tag that has been applied to a very odd fish that occurs around the world. The mola mola has been known and loved by sailors and divers who, throughout history, have best described the fish as one whose tail has been bitten off. In almost every tropical and temperate sea this fish can be found, lying on the surface on its side, basking in the sun. At the approach of a boat it will quickly flop away, but before disappearing very often it will leap completely out of the water, slapping its body in a noisy way on the surface as it dives back in. The sun-basking habits of the mola mola has earned it the nickname "ocean sunfish." There are other names for this sea oddity, one of the most common being "headfish," obviously because it looks like a big, floating head. *Mola mola* is a name given to the fish by the Swedish botanist Linne; "mola" means "mill wheel," and the name seems perfect because the fish does resemble a circular milling stone. □ The mola mola belongs to the Molidae family of sunfishes and headfishes, which contains three genera and about six species. the genus *Mola* has one species only — the *Mola mola*. It is a fish of the open seas and is fairly common where found, i.e., off Australia, around Hawaii (where it is also called Kahala or Makua), off both sides of the Atlantic, and in the eastern north Pacific where it is found from Alaska to well below the Mexican border. From time to time it is abundant off California, especially from the San Francisco area south. The mola mola can grow to an enormous size. A record 4400 pounder collided with a steamer off Australia and "sent it limping home." This particular fish was 10 feet long, two and a half feet thick and 13 feet high. Previous record was a 3300 pounder hit in

the Tasman Sea. Maximum growth limit is normally around 2000 pounds, but off California the mola mola will rarely exceed three feet in length, or 125 pounds. □ The adult mola mola is easily recognized by its oval, silver colored body. The tough leathery hide is scaleless and elephant like, covered with a slime. The tail fin is scalloped and is rather useless. The fish propels itself with the large dorsal and anal fins which beat alternately back and forth, from side to side, in a comical way. Often the sluggardly fish

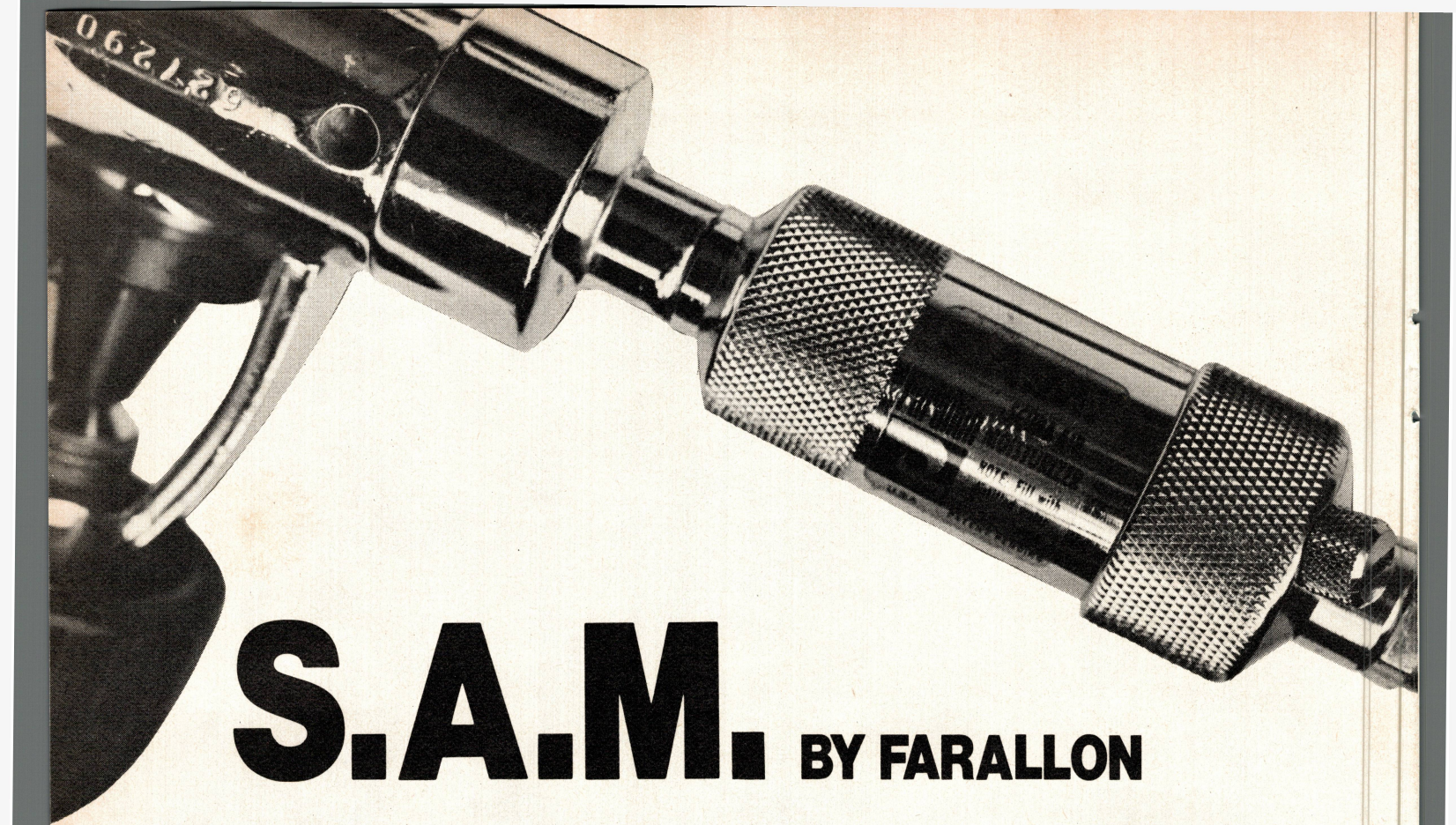


will simply paddle itself around on its side. □ The juvenile mola mola looks quite different from the adult. It is a tiny pea-shaped fish that literally bristles with spines, or jutting triangular projections. These spines disappear as it grows. It is not known where the mola mola spawns, and according to

California biologists J. E. Fitch and R. J. Lavenberg, fertile eggs and early larvae have never been found. However, it is known that a female will lay an incredible 300 million eggs in one spawning. □ The diet of the mola mola is as weird as the fish itself. It munches primarily on jellyfish, but ctenophores, crustaceans, small fish and pelagic mollusks (larvae) have been found in their stomachs. These fish are heavily infested with tapeworms and other parasites, which is why the California diver will often see them surrounded by a host of cleaner fish such as surfperches or senorita wrasses. It is also why the California diver can very often have the thrill of approaching and scratching the fish, which sometimes seems to enjoy a rubdown from a human. Fishermen have even seen gulls and other sea birds perched on top of a floating sunfish, pecking off parasites. In fact, when the mola mola leaps out of the water and splashes down on the surface, chances are that it is doing it to knock off parasites and because it simply feels good to the fish. ➤

Photo By Bob Evans - Text By Hillary Hauser

Photo taken in 25 feet of water off the southern California coast. Evans used a Nikon F camera with 24mm lens, Subsea strobe, High Speed Ektachrome, 1/60 sec. at f8, four feet from subject.



S.A.M. ■ BY FARALLON

AN EXCLUSIVE SDM PRODUCT REPORT

By Jack McKenney

At \$24.95, S.A.M. has to be one of the greatest little inventions since the regulator. S.A.M., which is an acronym for *Scuba Air Moisturizer*, is a small cylindrical chromed brass housing that contains an activated charcoal cartridge, a nylon filter and screen, an ABS plastic cup and venturi tube, and a fluid retention element. It fits between the first stage and the low pressure hose of any American-made single hose regulator, and provides two valuable functions. It automatically moisturizes the dry air that a diver breathes and it cleans the air of any impurities and odors.

When I was a diving instructor and reef guide at the Underwater Explorers Club in Freeport, Grand Bahama Island, I used to average three dives a day in the ocean, sometimes making as many as five a day. I enjoyed spending that much time in the water, but one thing I really dreaded toward the end of my second or third tank of air was "dry throat". It used to get so bad, it would burn all the way down into my stomach. It was, of course, caused by the dry air in my scuba tank.

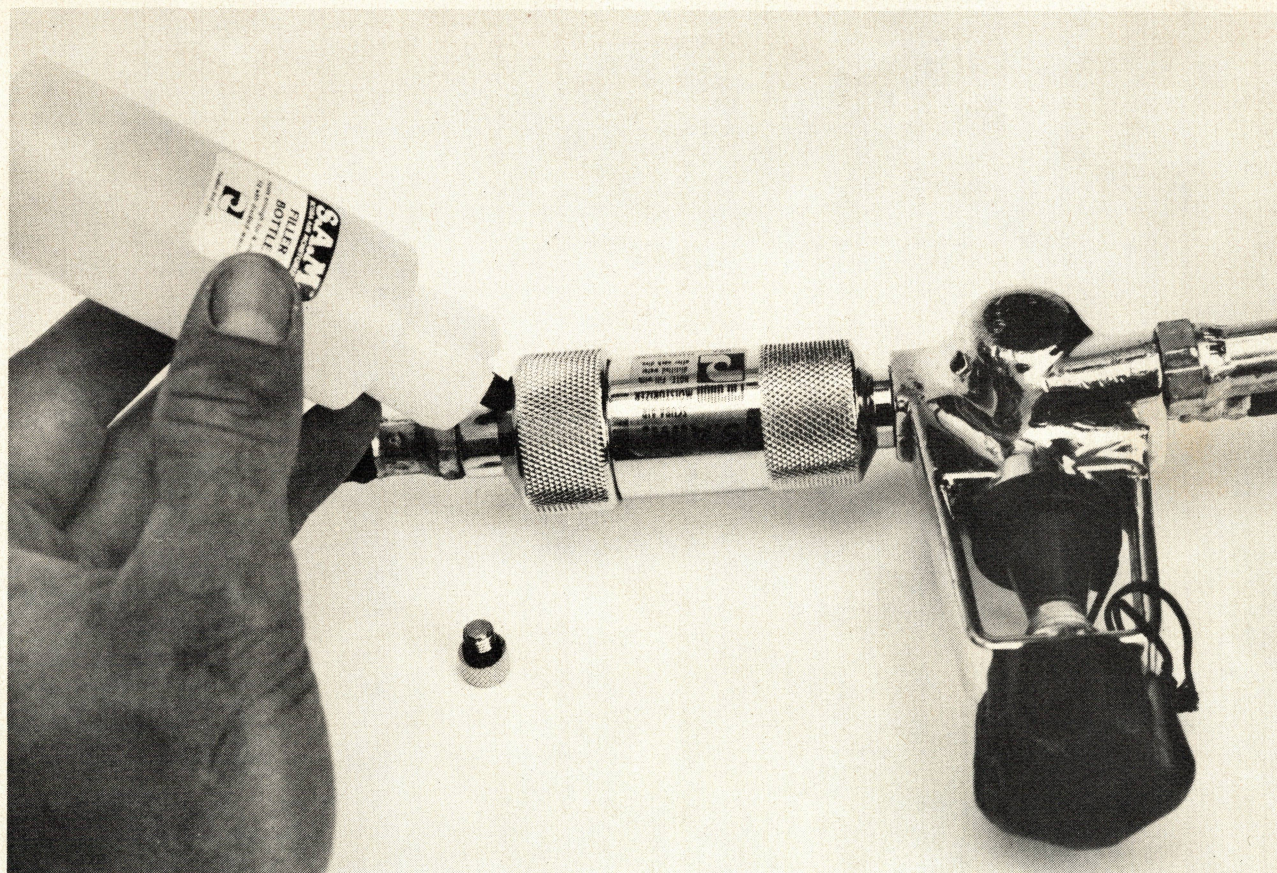
Out of the water, as air goes whizzing down one's trachea, there is usually enough moisture content in the air to prevent this dryness. However, as all of the moisture is essentially filtered out of compressed air during the scuba tank filling process, a diver may experience this dryness after using just one tank. The obvious solution then is to put the moisture back into the air as inexpensively as possible, but certainly not while it is in the cylinder because it would cause the scuba tank to corrode. Ralph

Shamlan, president of Farallon Industries, and his engineers, put on their thinking caps and the result is that Farallon is now manufacturing S.A.M.

Before attaching S.A.M. to your regulator, unscrew the unit and place the fluid retention element, which is made of a urethane foam with a high wicking property, into a glass of distilled water. It's important to use only distilled water, to prevent impurities from gumming up the second stage. After five minutes, the element will be saturated and can then be inserted into S.A.M. and the unit screwed back together. After this initial water saturation operation, S.A.M. is refilled after every dive with the handy little refillable bottle that comes with it. Access to the fluid retention element is accomplished by unscrewing the O ring sealed, knurled filling plug. S.A.M. holds about one ounce of water.

As a diver breathes through S.A.M., the air first makes contact with the activated charcoal cartridge. Activated charcoal has been heat treated to be chemically pure and has the peculiarity and great capacity to absorb organic impurities such as hydrocarbons and oil. The charcoal has incredible surface area and any impurities that are in the air passing through it will cling to its many surfaces.

Behind the activated charcoal cartridge is a metal screen and nylon filter. Because the activated charcoal element is fabricated of tiny granules bonded together, one or more of these granules may possibly come loose when it is handled, so the screen and filter prevent any of these minute particles from entering the low pressure hose. The nylon filter is



photography by Author

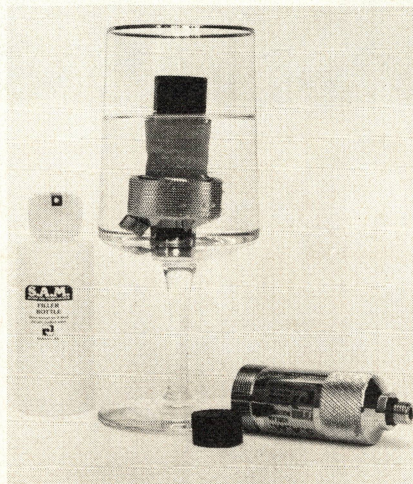
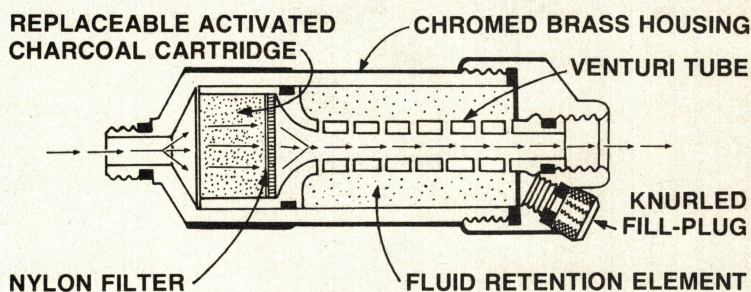
very fine, but allows the air to pass through unrestricted without any difference in performance to the regulator.

After passing through the nylon filter, the air flows down through the plastic venturi tube which runs the length of S.A.M. As it does, it creates a low pressure zone causing water droplets to be drawn out of the foam by vacuum, through the tiny holes, and into the air stream. This moisturized air flows up the low pressure hose through the second stage to the diver. And because the water is distilled it will not harm any of the second stage components.

It's interesting how man can instantly adapt to environmental changes. When I first used S.A.M. my immediate reaction was that I really didn't notice any difference. I then made a second dive without it and immediately noticed what it was that I was missing. There was a distinct difference between the moisturized air and the dry air.

The activated charcoal cartridge should be changed after every 100 dives or so. Farallon suggests 25 dives, but the majority of air filling stations are pumping pretty clean, dry air so I don't think changing that often will really be necessary. The fluid retention element should be refilled after every dive — and only with *distilled* water!

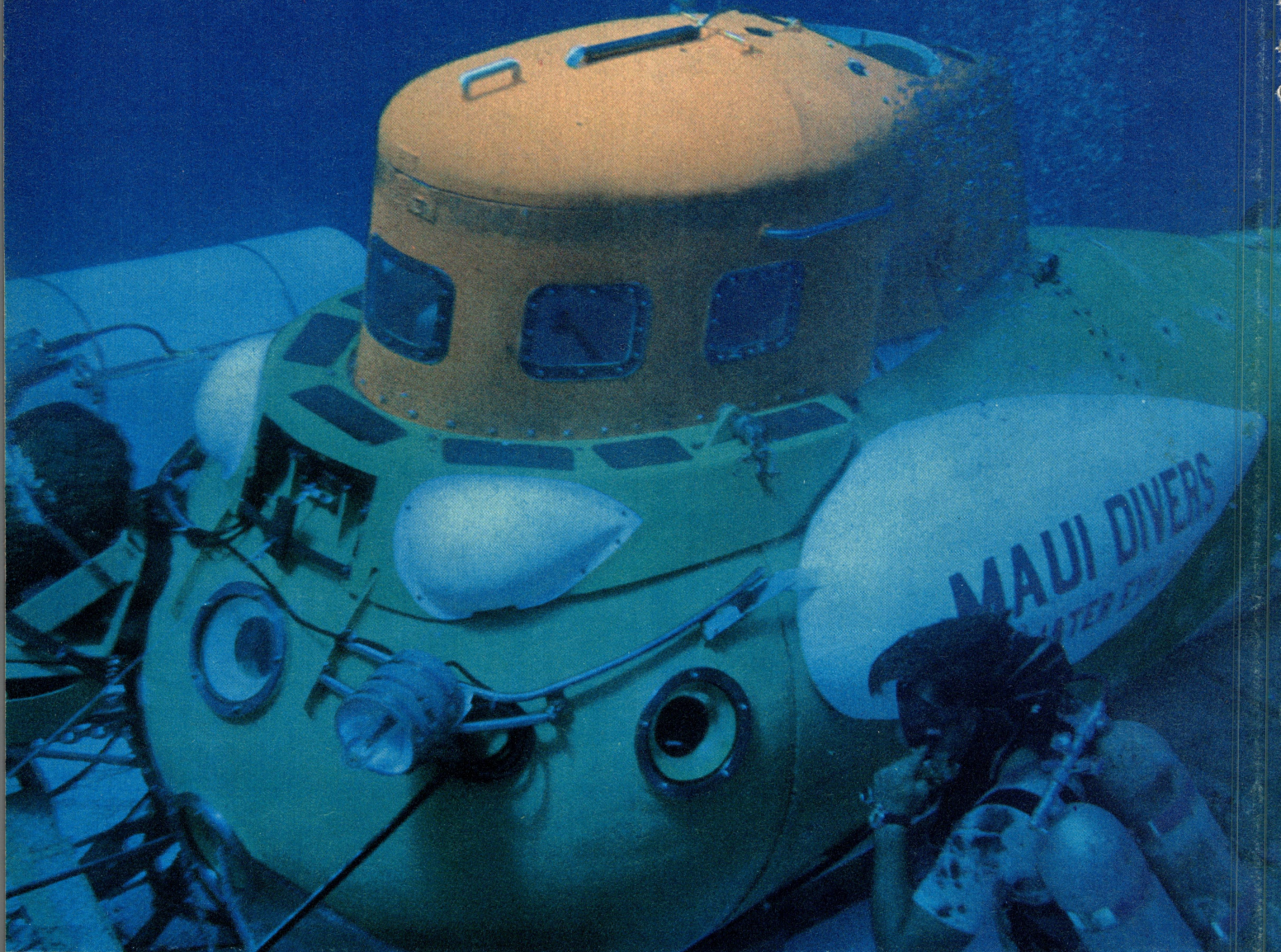
Like the ad says, using S.A.M. really does beat the hell out of feeling like you've been snacking on burlap. Ask about it at your nearest professional dive shop and tell 'em the ex-burlap snacker sent you around. >S&P



S.A.M. will fit any American made regulator to moisturize compressed air. Before attaching S.A.M. to your regulator, first soak it in a glass of distilled water, being careful not to get any water into the activated charcoal chamber or nylon filter. Refill S.A.M. after every dive with distilled water only.

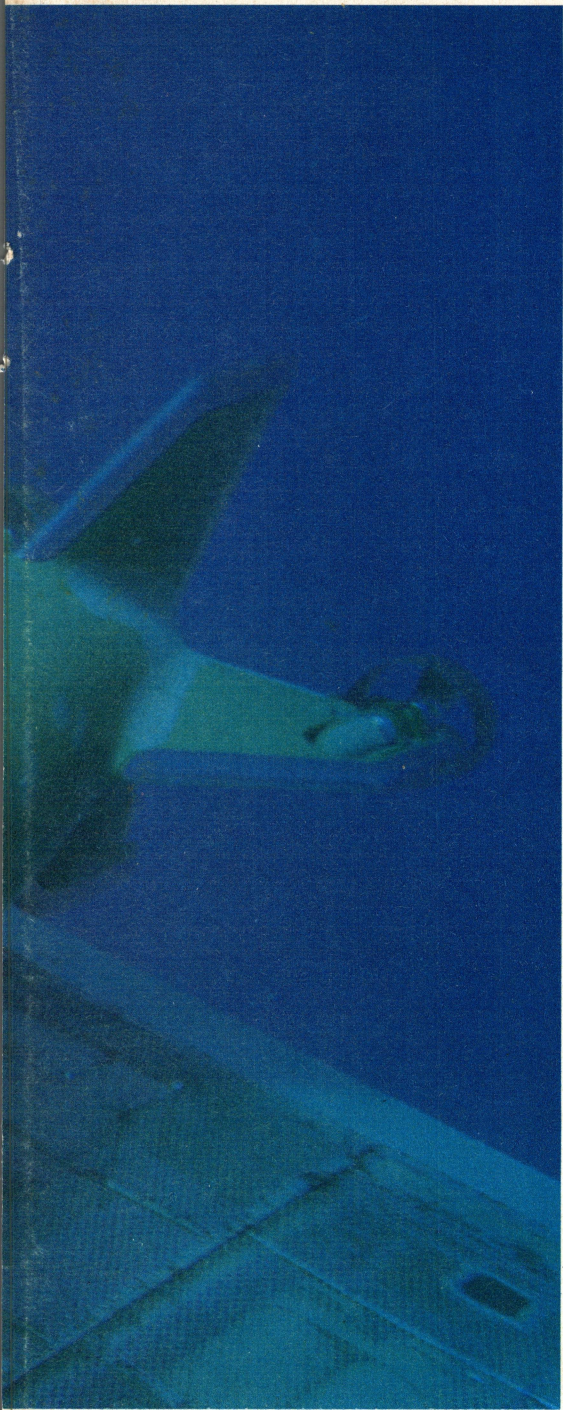
"Look to this day! For yesterday is already
a dream, and tomorrow is only a vision."

From the Sanskrit



PINK CORAL

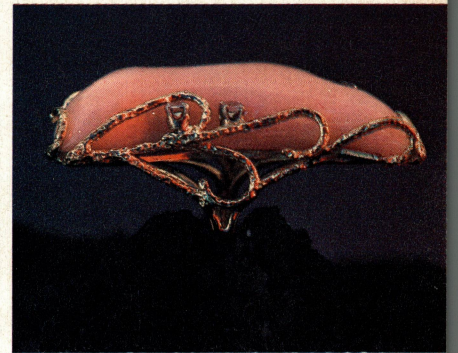
By Ellsworth Boyd



photography by Maui Divers, Ltd.



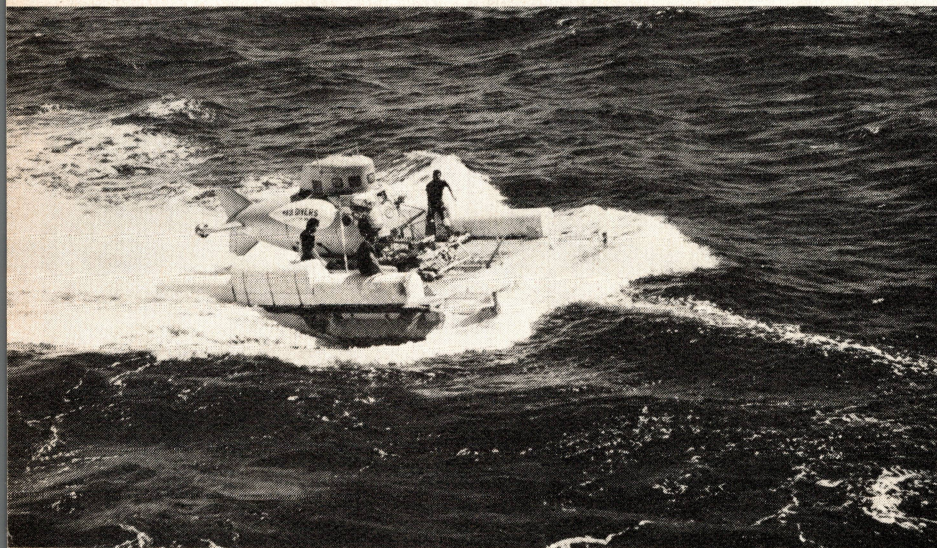
A pink coral colony in its natural state has the bleak look of a leafless tree in wintertime. To survive, it requires a depth of at least 1200 feet and Maui Divers, Ltd., harvests it with a Star II submersible. The "tree" is sheared off at its base, then taken to the factory to be fashioned into beautiful jewelry. Pink coral varies in color from salmon red to almost white, but the most desirable is a delicate pink.



Columbus' search for the new world . . . the inventor's dream of perpetual motion . . . the Wright brothers' desire to fly. For as long as we have any record of his existence, man has attempted to turn his hopes and dreams into realities. Some efforts failed while others were incredibly successful.

Clifford D. Slater, president of Maui Divers of Hawaii, successfully turned yesterday's dream into a reality. He looks forward to each new day and an eight million dollar pink coral bonanza that continues to go up as he goes down. In this instance, "down" means 1200 feet in a 17 foot long, deep-diving submersible called *Star II*. That's how deep Maui Divers, Ltd. has ventured to produce some of the finest quality gem material in the world.

The company was started in 1958 by a few divers from the island of Maui, 100 miles southeast of Honolulu. Diving in quest of black coral, these early underwater adventurers found colonies 150 to 250 feet deep. In 1962, Cliff Slater was en route to New Zealand when he was forced to limp into Hilo with a dismantled schooner. On the neighboring island of Maui, he joined in with the original founders of Maui Divers, which was then a combination dive shop and curio store selling hand-fashioned black coral jewelry. Later, new owners bought out the original founders and Slater became president. With keen business minds and venturesome spirits Slater and others launched a full-scale operation which grew into the world's largest precious coral jewelry manufacturing company.



Maui Divers, Ltd., was started in 1958 by a few men in quest of black coral at depths to 200 feet. Ten years later, a pink coral bed was discovered off Makapupu, Oahu, and now employees dive routinely to 1200 feet in a submersible. The Star II is launched from a twin-pontooned raft, the LRT, which is towed to the dive site by the research vessel Holokai.

The firm, which started with three people, now employs over 500 workers, mostly islanders. Picking, processing, designing and marketing black, gold and pink coral, Maui Divers, Ltd. has moved its major operation to Honolulu, but retains Maui Island's name.

Through the efforts of the State and the University of Hawaii, an extensive bed of pink coral was discovered in 1968. A limited resource, it's located off Makapupu, Oahu, in the Molokai Channel. Close inspection by the University of Hawaii's Dr. Richard Grigg, in the Makapupu-based submersible *Star II*, bore out first assessment of the supply.

The discovery touched off a wave of excitement when spectacular "gem quality" samples were returned to the surface. One year ago a superior colony was discovered in the bed and classified as "priceless." It was so translucent one could actually see into it.

Dr. Grigg, working out of the University's Institute of Marine Biology, is one of the world's noted specialists in gorgonian corals — the classification that includes pink coral. He has been aided by state and federal funds, the latter from Sea Grant, Washington, D.C. A strong advocate of conservation, he recommended that all harvesting be selective and dredging be outlawed. President Slater and other executives from Maui Divers heartily agreed.

Through selective harvesting, the amount picked can be limited so that it doesn't exceed the coral growth rate. This permits prolonged use of the coral bed and contributes to its conservation. Grigg isn't worried about depletion of the coral as long as Maui Divers follows his recommendation not to exceed 3500 pounds per year from the Molokai Channel bed. He estimates that bed at about 100,000 pounds, net worth — \$2 million. The bed is on a slope starting at about 1200 feet, but the *Star II* can only cover the top of it. Some parts of the bed may not be touched for a long time.

"We're still in a stage of research and development," Grigg explained. "It's not a proven operation economically. We've got to discover more beds in order to meet the high costs of the operation. Each dive in the *Star II* costs about \$2,400." (The sub is leased from the Electric Boat Division of General Dynamics Corporation).

The *Star II* is launched from the deck of a twin-pontooned raft called an "LRT" — Launch Recovery Transport vehicle. Flooded down to 60 feet beneath the sea, where the turbulence subsides, the *Star II* lifts gracefully off the LRT like an airplane leaving the deck of a carrier. When this "stage" drifts free, it will be heading down 1200 feet. The *Holokai*, a rugged research vessel, tows the LRT and submersible to and from the dive site. It also

provides a safe surface base for operations while the *Star II* is at work.

Bohdan "Bo" Bartko is the *Star II* pilot, who quipped, "I'd rather dive this sub than do anything else in the world." He "does his thing" three days a week, about six miles off Makapupu, in the only extensive pink coral bed found near Oahu. Besides Bo Bartko, the Maui Divers field crew includes Dave Seefeldt, skipper of the *Holokai*, Joel Petersen, engineer and deck hand, Dave Johnston, LRT captain, and support divers Rick Inada and Jim Woefel.

Bartko occasionally nudges the bottom as he pilots the sub with one control and prepares to operate the controls used in collecting the coral "trees." One of these is the coral cutter, the backbone of the harvesting system that Bartko helped develop. It consists of a cutting blade that rotates, shearing off the coral tree at its base. A basket catches the coral, while a hydraulic arm and claw hang ready to pick up any stems that escape the basket. Maui Divers prides itself in this selective approach to harvesting as opposed to destructive dredging techniques.

There is partial light at 1200 feet. Bartko describes it as "pale moonlight." But with the sub's lights beaming 2000 watts, the ocean glows like a Christmas tree in 50 foot visibility. There are two ports in the bow of the sub and one on either side for bottom espial. Marine life is sparse at that depth, but sometimes small eels and crabs can be seen.

The five ton *Star II* was originally designed as an inspection vehicle for offshore oil rigs, not as a heavy-duty, deep-water workhorse. Therefore harvesting is easier during slack currents. Tides are not always predictable and Bartko, like the perennial elevator operator, has experienced his share of "ups and downs," with a few bumps and grinds. The sub has a long tail for stability, but this can handicap the pilot. The *Star II* lacks the maneuverability necessary to make quick turns and isn't suited for harvesting downhill.

The *Star II* travels at about two knots. It has life support for 48 hours, but four hours is the most Bartko can harvest. "The sub uses a tremendous amount of power maneuvering," he explained, "and it's a limiting factor. If the batteries didn't wear down, I'd be down eight hours and never quit. It's like hunting for gold — you're always looking for a strike just over the next hill."

The biggest load ever harvested weighed 150 pounds. An average haul is between 50 and 70 pounds. Prime pink coral is worth more than \$400 a pound.

Pink coral varies from salmon red to almost pure white. The highest quality and most desirable is a delicate translucent pink called "angelskin." Values vary according to color and size. Coral

experts have identified 100 different shades of pink! Gem material must be compact, free from spots and capable of taking a good polish.

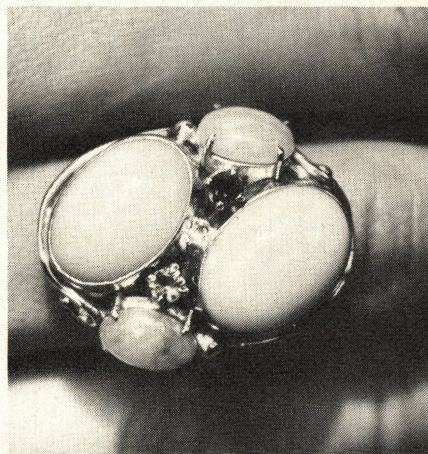
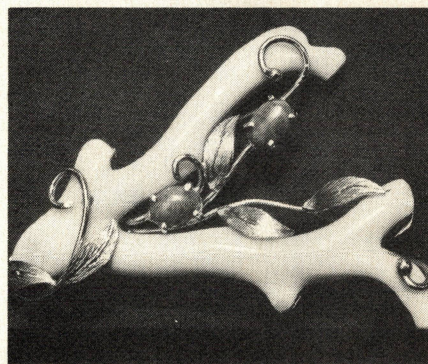
Like black coral, a pink coral colony in its natural state has the bleak look of leafless trees in wintertime. It's also very hard. As the *Star II* brings them up, the pieces are sorted, but the outer layers of living coral polyps are removed back at the dock. Then they're shipped to the Maui Divers' plant for sorting.

Here, the coral is stored in a warm, dry room to sap the moisture from the pieces, rendering them suitable for lapidary techniques. These steps include sawing, sanding, polishing and buffing until a beautiful luster appears. Pink coral has a great density and much of this work must be done under a fine spray of water to reduce heat friction. No lacquers, waxes or other materials are used to enhance the natural luster of pink coral.

The high quality of Maui Divers' coral jewelry has been achieved through unique planning and production. Foremost is the custom design department, responsible for original designs and models in 14 karat gold. All gold casting is done by using the lost wax method. To cast a ring for instance, a wax model is made first. Then plaster of paris is poured over it. When the plaster dries, heat is applied to melt the wax away. Then gold is poured into the plaster mold, casting an individualized mounting for an exquisite piece of pink coral. The final product, a precise combination of mounting and stone, results in handmade piece of coral jewelry, totally different from anything else on the market. A ring like this, depending on the size of the gemstone, would retail for \$1,000 and up. This is called a "one-of-a-kind" item. There are however, some production items in solid gold that retail for \$50 to \$100.

Company standards are high. Whenever sapphires, rubies, opals or emeralds are used, they are genuine. There are no synthetic materials of any kind. All diamonds are of fine quality and fully cut, while pearls are cultured. But this doesn't mean that the average person can't afford a pink coral creation. The pink coral lines feature a number of items mounted in gold filled styles. The price ranges on these are quite modest, enabling the retailer to select merchandise which will appeal to a broad cross section of the buying public.

Thanks to the fusion of science and industry, man has uncovered a precious underwater resource that is benefitting hundreds of workers in Hawaii. It's also a boon to thousands of jewelry outlets throughout the world. And as for "milady," she's "thinking pink" too, delighted with this new exotic jewelry from the submarine world around our mid-Pacific archipelago. 🐠



Bo Bartko, shown holding a pink coral branch on deck of the LRT, is pilot of the *Star II*. By retrieving the coral from depths of 1200 feet, he starts a whole process which ends in beautiful jewelry produced by Maui Divers, Ltd. First the coral must be dried, then sawed, sanded, polished and buffed to bring out the coral's natural luster. If other gems are used with coral in jewelry, they are genuine, with settings of 14 karat gold.

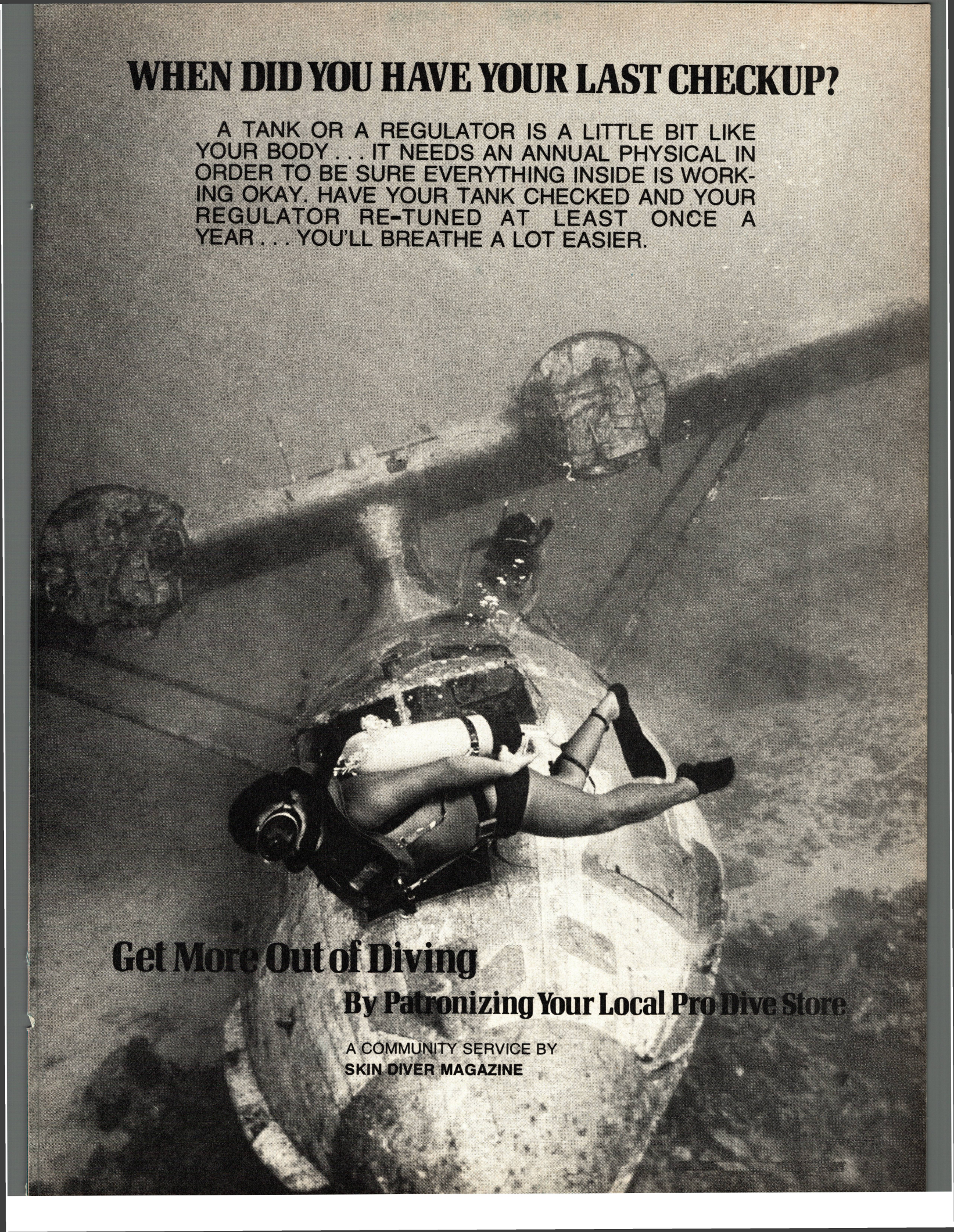
1975 UNDERWATER FILM FESTIVALS AND SYMPOSIUMS

DATE	EVENT	PLACE	CONTACT
MAR. 8	BOSTON SEA ROVERS CLINIC (Boston, MA)	Boston Univ. John Hancock Hall Boston, MA	Robert Newberry 87 Bellingham St. Chelsea, MA 02150 (617) 884-2355
MAR. 15	GREAT PLAINS DIVING COUNCIL CONVENTION	Ramada Inn Kearney, NB	Wilma Rayburn Rt. #1 Kearney, NB
MAR. 22	TRINITY UNIV. U/W FILM EXPO. (San Antonio, TX)	Trinity Univ. Laurie Auditorium	Robert Crews Box 120-715 Stadium Dr. Trinity University San Antonio, TX 78284 (512) 824-7688
MAR. 22 & 23	MAN IN THE SEA SYMPOSIUM (Seattle, WA)	Pacific Science Center Seattle, WA	Bill High 6531 N.E. 198th St. Seattle, WA 98155 (206) 442-7796
MAR. 22	CALIFORNIA U/W EXPO. (Anaheim, CA)	Anaheim Con- vention Center Anaheim, CA	Marty Cohen 1212 N. Broadway - Suite 212 Santa Ana, CA 92701 (714) 835-1205
APR. 5	UNDERWATER SYMPOSIUM (Boston, MA)	Harvard Univ. John Hancock Hall	Fred Calhoun P.O. Box 291 Back Bay Annex Boston, MA 02117 (617) 338-6000
APR. 12	INNERSPACE '75 (N. Dartmouth, MA)	Southeastern Mass. University N. Dartmouth, MA	Cornelius Driscoll 119 Howard Ave. New Bedford, MA 02745 (617) 998-2553
APR. 18 & 19	AQUARIUS U/W FILM EXPO. (New York)	Westchester Co. Auditorium New York	Steve Kimber P.O. Box 7666 Long Beach, CA 90807 (213) 597-4356
APR. 26	SYRACUSE U/W FILM FESTIVAL (Syracuse, NY)	Regent Theater, Syracuse, NY	Gerry Hollenback National Aquatic Service 1425 Erie Blvd. E. Syracuse, NY 13210 (315) 479-5544
MAY 2, 3, & 4	OUR WORLD-UNDERWATER (Chicago, IL)	Sheraton-Chicago Hotel and Medinah Temple Chicago, IL	Joyce Markstahler 6222 N. Cicero Ave. Chicago, IL 60646 (312) 875-9133
MAY 3	11TH ANNUAL U.P.S. U/W FILM EXPO. (Oakland, CA)	Oakland Aud. Oakland, CA	John O'Hara Bamboo Reef 3765 Redwood Hwy. N. San Rafael, CA 94903 (415) 479-4332
MAY 10	PHOENIX U/W FILM EXPO. (Phoenix, AZ)	Grady Gammage Aud. Arizona State Univ. Tempe, AZ	Gene Foster 2245 W. Broadway Mesa, AZ 85202 (602) 833-2971
SEPT.	SAN DIEGO 11TH ANNUAL U.P.S. U/W FILM FESTIVAL (San Diego, CA)	San Diego Civic Aud. San Diego, CA	Tom Harman Diving Locker 155 S. Highway 101 Solano Beach, CA 92075 (714) 755-6822
SEPT.	INWARD TO THE SEA FILM FESTIVAL (Washington, D.C.)	Lisner Aud. Washington, DC	Ron Young P.O. Box 713 Riverdale, MD 20840 (202) 692-7400
SEPT. 20	U/W FILM REVIEW FALL EDITION (Boston, MA)	Harvard Univ. John Hancock Hall Boston, MA	Fred Calhoun P.O. Box 291 Back Bay Annex Boston, MA 02117 (617) 338-6000
SEPT. 27, 28, & 29	IQ-7 FILM SHOW (Miami, FL)	Carillon Hotel Miami, FL	Jon Hardy NAUI 22809 Barton Rd. Grand Terrace, CA 92324 (714) 783-1862
OCT.	SEA SPACE '75 (Houston, TX)		Ken Young Houston U/W Club P.O. Box 806 So. Houston, TX 77587 (713) 946-6325
NOV. 2	PHILADELPHIA SEA HORSES 10TH ANNUAL U/W FILM EXPO.	Irvine Aud. Univ. of Pa. Philadelphia, PA	Jack Brown 4528 Tacony St. Philadelphia, PA 19124 (215) 744-4706

Please send details of any scheduled underwater film festival not listed to SKIN DIVER MAGAZINE for future listings.

WHEN DID YOU HAVE YOUR LAST CHECKUP?

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News Briefs

By Hillary Hauser

THE BERMUDA TRIANGLE: ONE STEP BEYOND?

"Everything is wrong . . . strange . . . we can't be sure of any direction . . . even the ocean doesn't look as it should." With those final words a flight of five Navy TBM Avengers, with a combined crew of nine men, disappeared in the notorious Bermuda Triangle. The Bermuda, or "Devil's" Triangle, is a three-sided section of the Atlantic Ocean, with Bermuda, Miami and Puerto Rico as its apexes, in which mysterious disappearances have been occurring for years. Aviators lose their bearings suddenly for no apparent reason, sailors have vanished without a trace, and those left to figure out the mystery are completely baffled. Said a Naval board of inquiry studying the disappearances: "We don't know what the hell is going on out there . . . they vanished, as completely as if they had flown to Mars."

Now, Charles Berlitz, whose book *The Bermuda Triangle* is fast becoming a best seller, has offered a few explanations. He hints that the mystery reaches back in time to ancient civilizations destroyed by cataclysm, and out into space to other galaxies where intelligent life may exist. He says that it might even involve a universe next to ours — another dimension into which we might slip and never return. The Bermuda Triangle could possibly be the roadway to that other dimension.

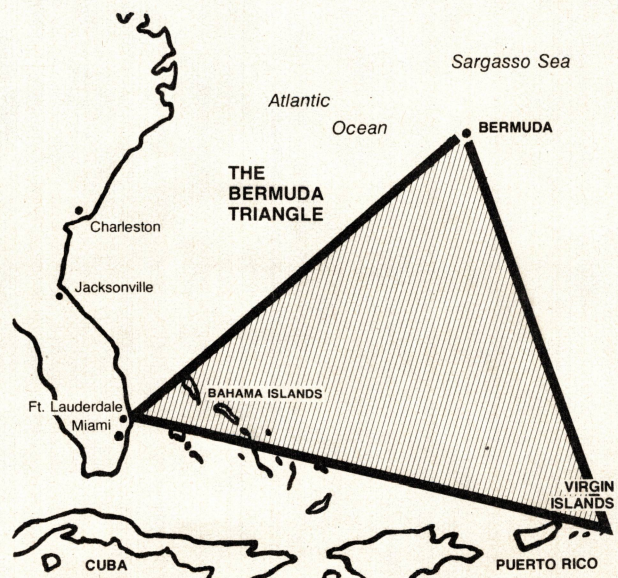
These ideas are rejected by the Federal Aviation Agency and the Miami Coast Guard, who say that in 200,000 square miles of mostly water it is not unusual that there are disappearances. A spokesman for the Coast Guard said that planes or ships that sink in the area would probably be pulled north along the bottom of the ocean by the Gulf Stream, and that much of the free-floating debris in the North Atlantic could be wreckage of disasters in the Bermuda Triangle. Also, he pointed out that the Bermuda Triangle is one of two areas in the world where compass needles point to true north, not magnetic north (the North Pole) as they do everywhere else. "If this compass variation is not accounted for," he said, "you can be put off your course by as much as 100 miles. You can be going out to sea and think that you're going back to shore." In this light, many of the disappearances, he thinks, are due to poor navigation.

Berlitz isn't satisfied with that answer. "What we know is that ships and planes are disappearing in the area at the alarming rate of one boat a week and two planes a month." Many people are saying that they have experienced strange things, i.e.: compasses cease working, electric systems are drained, planes glow with an eerie phosphorescence, greenish-white clouds appear out of nowhere. Berlitz, who has studied the radio communications of lost navigators, has determined that the cloud is always there. He thinks it could be an electromagnetic haze, which could explain the mechanical failures.

But Berlitz goes one step further: he says the haze could very well transform matter into an invisible state. He points out that for three decades the U. S. Navy has conducted successful experiments with magnetically induced disappearances at the Philadelphia Naval Shipyard. A ship and its crew was reportedly made invisible and then visible again, according to unverified reports, some men died during the experiments and others became emotionally disturbed, and some "continued to disappear and appear again from time to time over the years."

If magnetism is involved in the Bermuda Triangle disappearances, Berlitz says it may emanate from a power source beneath the sea. The source could be the lost civilization of Atlantis, which has been a subject of much conversation following the discovery of man-made structures in the area. Berlitz adds, "Or, there may even be a civilization flourishing beneath the sea now . . . one that suddenly has become alarmed by man's pollution of their previously remote and protected environment." Further, Berlitz points out that most sightings of UFO's and unidentified submarine objects — strange vehicles beneath the sea — have occurred in the Triangle area. He says that even Columbus reported seeing a "flaming shield" hurl past his ship down into the water.

The fact that entire crews have vanished in the area, while their ships remain afloat, has given rise to the "cosmic zoo" theories, wherein alien creatures are collecting humans for study in some other part of the universe. All told, it would appear that the scientific truths about the Bermuda Triangle may assuredly be stranger than fiction.



LINK HONORED

In November of last year, Edwin A. Link received the Gold Medal of the International Oceanographic Foundation (Miami) for his "outstanding contributions to oceanography." F. G. Walton Smith, IOF president, made the presentation at the annual society banquet at Key Biscayne. Link, who launched the research vessel *Sea Div* in 1959 as only one of his many ocean-oriented activities, has served on the Presidential Task Force on Oceanography and currently acts in an advisory capacity for the Task Force. Previous recipients of the IOF Gold Medal include Charles C. G. Chaplin (ichthyological research) and William R. Mote (Mote Marine Lab).

HARMFUL PENALTIES

They're not messing around in Russia these days — especially in waterways. If anyone under USSR jurisdiction pollutes the high seas, Soviet territorial waters, or inland waterways with substances harmful to humans, animal organisms and flora, it is considered an offense by international agreement. The penalties? Deprivation of freedom up to two years, or corrective labor for a period of up to one year, and a fine up to 10,000 rubles. Sentences are higher if pollution causes "considerable harm."

DEIC SERVICE

In case you've forgotten, or have missed it as it has gone around, the Diver Equipment Information Center, located at Battelle's Columbus Lab, provides the diving community with rapid access to literature pertinent to diving equipment. The DEIC has more than 12,000 documents on such things as scuba and hookah equipment, masks, suits, CO₂ scrubbers, regulators, tanks, gas supplies, diver performance, etc. For information, write DEIC, Battelle Columbus Lab, 505 King Ave., Columbus, Ohio 43201.

CONTRACT FOR \$500 MILLION IN TREASURE AWARDED TO SEABORNE

The discovery of the Spanish galleon *San Josef* near Cartagena by a U.S. treasure salvage company has resulted in a package deal with the Colombian government that will allow the company to salvage all treasure ships sunk in the Cartagena harbor. Seaborne Ventures, Inc., (Huntington Beach, Calif., and Miami) has entered into an exclusive contract with the Republic of Colombia to excavate and salvage 71 or more shipwrecks in the harbor — and the treasure may amount to as much as \$500 million.

The *San Josef* was the lead ship of a Spanish treasure fleet that was attacked by British ships on the morning of May 28, 1708, only moments after the fleet was out of port. Fourteen ships made it back to the Cartagena Harbor, two were captured, and the *San Josef* blew up and sank. The *San Josef*, which may have \$40 million on board alone, has been charted, and salvage operations are to begin this year. Dennis Standefer, president of Seaborne, says that his contract with the Colombian government will last five years and that as part of the agreement an extensive amount of research has been made available to the company, detailing the locations of the 71 wrecks.

Seaborne has their face masks in other treasure spots. While their dispute with the state of Florida is being settled (News Briefs, Feb.) they have moved on to make a significant find off Nicaragua: two extremely unusual medallions from a 270 year old Spanish wreck, yet unidentified. One of the medals is silver, bearing the image of Archduke Leopold of Austria and King Phillip IV of Spain. The other is cast in bronze, dated 1612 in Roman numerals, and bears the likeness of Archduke Leopold, Bishop of Strassburg and Passau, founder of the Jesuit College of Passau in 1612. Dr. Else Giordani of Vienna, Austria, who is researching the finds, believes that a missionary named Pater Paul Weingartner, born in 1678 and a member of the college, carried the medallion to the New World for identification. The voyage ended in disaster, and Weingartner drowned when the ship wrecked in 25 feet of water about 125 miles east of Nicaragua. Dr. Giordani hopes that his findings on the silver medallion will help to identify the ship. The wreck site is very near the ancient route used by early Spanish galleons to carry treasure from the ports of South America to Havana and on to Spain.

EGG INFLATION

Caviar, at \$100 a pound, is the most expensive food in the world, and the price is going up. That's because the rivers where the sturgeon is usually found in Russia are becoming so polluted that the Russians themselves are importing their caviar from Iran. "Today, a sturgeon in the Volga is like a czar in the Winter Palace," writes Bill Gale in *Signature*. Further, the Caspian Sea is evaporating and leaving the resident population of sturgeon high and dry. Environmental

experts have been yelling that oil well fires alone on Soviet shores could kill all the fish in the Caspian Sea.

MANATEE REFUGE

Manatees will now get their own stomping grounds, and hopefully the move will afford them protection from shooting, hunting and vandalism. The state of Florida has purchased the Blue Springs recreation area along the St. Johns River for them. Campers and visitors welcome; boaters, divers, swimmers are out.

BORERS GET WORM

A pesticide has been developed that is less toxic to mammals than DDT, and it comes from a marine worm. A *Sea Secrets* report states that three Japanese scientists have isolated and synthesized amine nereistoxin, a compound found in the worm, that acts as an insecticide. 1500 tons of one of the derivatives, called Padan, have been produced and has proven effective in controlling the rice-stem borer.

BLUB! OPERATOR?

Not long ago Hawaii got an underwater telephone booth — but service was only temporary. The booth was built specifically for an undersea test by the Hawaiian Telephone Company, which speculated that such phone systems could be used in future undersea communities. Members of the Kamalii O'Kai marine science club at Pearl City High School anchored the watertight phone booth at 25 feet and then got to talk to their friends ashore.

ODDS & ENDS

Navy Cmmdr. Don Walsh (commander of the *Trieste* I ocean dive in the Mariannas Trench in 1960) recently stated that French team will make an attempt in early 1975 to dive to 2000 feet using scuba equipment only. . . . We recently received a news clip from reader Norma Holcombe which states that divers have found gold coins in a Georgetown, S.C., river — presumably from the wreck of a Spanish ship. The divers, the coins and the location are not identified. . . . There's a piranha explosion going on in the rivers of Brazil due to hydroelectric plant building. Dams create more areas of quiet water, where the toothy fish breed. . . . An octopus was photographed at 15,591 feet near Barbados in the Caribbean by scientists aboard the *USNS Lynch*. A special camera got the photo, which is the deepest evidence to date for the eight-legger.



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SDH39

What's your basic decompression I.Q.?

Answers from questions on page 25.

- 1) B. In case of an emergency during a decompression dive, it is imperative to be compressed in a recompression chamber as quickly as possible. If the time factor from surfacing with the bends to being pressurized in a chamber is three hours, the chances are only 50 percent for immediate relief of symptoms and about 13 percent for no permanent damage. In most sport diving situations, a chamber is not readily available.
- 2) A. The U.S. Navy no-decompression table 1-11 indicates the maximum allowable bottom time without having to decompress.
- 3) B. The U.S. Navy dive tables take into account a rate of ascent of 60 feet per minute. Exceeding this rate could result in a bends accident if a diver is making a decompression dive or nearing the limit of a no-decompression dive.
- 4) B. The U.S. Navy tables 1-13 stipulates 190 feet as the maximum diving depth on a repetitive dive.
- 5) C. Complete excess nitrogen elimination from a diver's body requires 24 hours or more. A diver should take into consideration his residual nitrogen when planning repetitive dives within a 24 hour period.
- 6) A. Bone marrow absorbs nitrogen at the slowest rate, and consequently eliminates it at the same slow rate. Various body tissues absorb and eliminate nitrogen at varying rates depending on the density of the tissues and blood circulation to the specific area.
- 7) B. The last decompression stop is at ten feet and decompression stops are always measured from the chest.
- 8) A. Fatigue is one of the primary contributing factors for getting the bends. An overtired diver can often get the bends even though he is following the Navy tables faithfully. Good physical condition, sleep, and proper diet are all prerequisites for scuba diving.
- 9) A. Studies have revealed that vigorous exercise during decompression could be detrimental rather than helpful. It is best to remain relaxed and as still as possible, thus avoiding possible bubble formation by agitation.
- 10) A. The U.S. Navy tables are in ten foot increments. Whenever the actual depth exceeds an increment by even one foot, figure the dive for the next greatest depth increment indicated on the table: e.g., for a dive to 91 feet, figure the bottom time as 100 feet.
- 11) B. If unsure of the lapsed bottom time, take a longer decompression than planned. An extra five or ten minutes at ten feet may make the difference between a safe dive and a bends incident.
- 12) C. According to the U.S. Navy dive table 1-10, at 40 feet there is a bottom time limit of 200 minutes. Some scuba divers are under the erroneous opinion that they can remain at 40 feet indefinitely. Sport divers should memorize the no-decompression tables.
- 13) A. One of the more subtle symptoms of bends is a feeling of tremendous fatigue, possibly mixed with drowsiness. A diver should fight off the tendency to fall asleep right after a serious decompression dive until he is sure that he does not have the bends.
- 14) A. On any planned decompression dive it is good practice to suspend an extra tank and regulator at 20 feet so it will be available if a diver should run out of air while decompressing.
- 15) C. Leading diving physiologists indicate you often have a maximum of five minutes after surfacing before the onset of serious bends symptoms. A diver may return to the water during this period and continue decompression by remaining for one half of the ten foot stop time at the 20 foot stop, and one and a half times the scheduled time at the ten foot stop.

If you got all 15 questions correct, you have a good understanding of decompression diving. If you got three wrong you better burn some midnight oil over the textbooks. And if you got more than five wrong you shouldn't fill your single '72 more than half full, or dive below 30 feet . . .

Next month we'll be covering SCUBA EQUIPMENT CARE & MAINTENANCE.

WHAT IS UNDERWATER ARCHEOLOGY?

PART 1

By Robert F. Marx

Before zeroing in on a definition of underwater archaeology it is essential to understand what archaeology in a broad sense is all about. More than one dictionary states it is "the scientific study of antiquities"; another defines archaeology as the understanding of ancient civilizations in their totality through the discovery of objects belonging to ancient peoples. Some people think of archaeology almost in terms of art history of past civilizations. All are woefully inadequate interpretations.

Sir Leonard Wooley, the great archaeologist who discovered Ur, the city of Abraham, wrote: "The purpose of archaeology is to illustrate and to discover the course of human civilization through the excavation of ancient places of habitation." To think of archaeology solely as the search for man made objects is misleading. The real search is for knowledge of man's past derived from the interpretation of the artifacts found rather than the things themselves. The archaeologist is human. He enjoys finding beautiful or rare artifacts, but he prefers the knowledge to be gleaned from observation, recording and interpretation to the acquisition of artifacts.

Thus, the archaeologist excavates and identifies objects and their function. Equally important, he records the situation in which objects are found, their association with adjacent objects and their similarity or dissimilarity to objects from other sites. Written records of man's history go back five thousand years; but the very early records of literate man are extremely scanty and limited to a few geographical areas. This means that archaeology offers the best possibilities for understanding early man and for "fleshing out" our knowledge of certain aspects of the life of times not so far into the dim past. Until recently archaeological investigation was confined to dry land, man's natural habitat. Increasingly, however in the past several years awareness has grown of the great wealth of archaeological evidence lying beneath the waters which cover two thirds of the earth's surface.

The term "underwater archaeology" or its variants "submarine archaeology" and "marine archaeology" sometimes provoke uneasiness in certain land archaeologists. Actually, there is little difference between land and underwater archaeology. If a person is excavating a shipwreck under the freezing North Sea and is following accepted archaeological techniques and procedures he is as much practicing archaeology as the man excavating an ancient ruin beneath the scorching heat of the desert sun.

There is a clear distinction between underwater archaeology and underwater salvage. The latter term refers to the simple recovery of objects found on a shipwreck or other underwater site without particular regard for the site itself. Underwater archaeology implies excavating a site for the express purpose of obtaining archaeological data; the recovery of artifacts being of secondary importance. Salvage archaeology is a "quickie" form of excavation which is resorted to when a site, on land or in water, is threatened with destruction, as in the course of road construction, dam building or dredging. However, this does not imply that no attention is paid to the canons of archaeological procedure. Rather, it means the scope of the project is limited. Even in such a case the primary objective is to gather pertinent data and not merely to remove

artifacts from the path of destructive forces.

Ancient cultures were located between seas and most ancient trade was conducted across water. A great deal can be learned from excavation of underwater sites which no amount of land digging on dwellings, sanctuaries, public buildings and burials could reveal. Ships have sunk every year since archaic man first lashed two logs together to form the earliest primitive vessel. Before too long, underwater archaeologists will have found and excavated wrecks from almost every generation of reasonable antiquity. In many cases they will be able to determine what cargoes these ships carried, where they sailed and how they were constructed. Ships found in association with coins or other datable materials can furnish valuable comparative data for archaeologists working on land digs of roughly the same eras.

With the advent of underwater archaeology archaeologists and historians have been furnished with many artifacts which had never turned up on land. Although tens of thousands of silver and gold bars were shipped to Europe from the New World in the years of Spanish dominance, not one existed anywhere until a number were recovered from Caribbean shipwrecks in recent years. In light of the discovery, not long ago, of a platinum bar dated 1521 found on a shipwreck off Grand Cayman Island, history texts must be revised. Modern metallurgy texts state that platinum was not in use until the nineteenth century because it was thought that until that time there was no way to produce the intensely high temperatures needed to refine and work the precious metal.

Many objects survive better underwater than on land. Rarely does a land archaeologist find ceramic artifacts intact; usually he must painstakingly reassemble a piece from many small shards. The chances, however, of finding hundreds, even thousands, of intact ceramic items on an old shipwreck are excellent. Ancient wrecks in the Mediterranean have yielded many shapes of terra cotta amphorae. Spanish wrecks in the Caribbean have given up to their explorers both Spanish olive jars and the pottery of many other European countries as well as exquisite pieces of fragile Chinese porcelain. Clay smoking pipes are almost impossible to find unbroken on land sites but more than six thousand of them were brought up in perfect condition from the sunken city of Port Royal. Glass bottles are rarely found unbroken on land but Port Royal's muddy bed allowed the recovery of more than twelve thousand whole seventeenth century bottles.

There are some normally ephemeral objects which have lasted better underwater than underground such as the complete human skull with the brain preserved within which was found in Florida's Warm Mineral Springs some ten thousand years after death. A nearby sinkhole, Fig Springs, was excavated by the late professor John Goggin, a pioneer in underwater archaeology in North America. He found Indian artifacts such as corn cobs, peach pits, gourds, woven cane matting, worked wood and animal hides; none of which would normally be preserved on a land site. At Port Royal such delicate items as tobacco leaves, human hair wigs and fragments of cotton and woolen clothing survived. In 1941 a page of a printed Bible published prior to 1695 was recovered from a

shipwreck and in 1961 a complete book of sailing directions in Dutch was found in a wreck from circa 1590 sunk off Cape Canaveral, Florida.

Not all the archaeological techniques developed for land digs are applicable to underwater excavation. There are some underwater sites which can be treated in the same way as a land site but by and large there are a number of factors which make each underwater site a challenge for the development of new procedures and techniques. George Bass has differed from other underwater archaeologists in his dogmatic belief that every underwater site can be surveyed and excavated stratigraphically by the same or similar methods employed on land sites. Proving this point was one of the reasons he turned to underwater archaeology. In the relatively deep water where he has worked, he has been able to work this way because the sites were undisturbed over the centuries by storms, wave action, currents and man. The opposite is true of sites in shallow water, which embrace most of the Western Hemisphere; they have been badly battered by nature and man and are scattered over wide areas of the sea floor. Also, in spite of the limitations involved in diving on the deeper Mediterranean wrecks, once the diver is down he is generally able to work comfortably with good visibility. On most wrecks in shallow water the diver battles rough seas and is hampered by poor visibility which make it impossible to utilize the surveying, photographic and excavation methods used deeper.

Underwater, as on land, the excavation of a site culminates in its obliteration so every effort should be made to faithfully and accurately record by measurement, drawing and photography, the excavation and the artifacts uncovered. Detailed published reports are the obligation of the archaeologist lest the information gained be lost forever, like the site itself.

To date, the Jamaican sunken city of Port Royal, which went down in 1692, is the only site in the Western Hemisphere on which an attempt has been made to completely and thoroughly excavate under the accepted "old school" archaeological standards. The methods used were akin to those employed on land sites and by Bass and Peter Throckmorton on the Bronze Age shipwreck they excavated in the Mediterranean. The site was marked off on a grid. A thorough survey was made and the position and stratigraphical level of all artifacts and sunken buildings were recorded. Photographs and scale drawings were made of everything recovered. All artifacts were properly preserved and reports were published on details of all aspects of the project. Port Royal was unusual for a Western Hemisphere site and had more in common with the Bronze Age Mediterranean wreck than with most of the badly broken up and scattered underwater sites in the Caribbean. It sank quickly beneath protective harbor mud so that

most of the artifacts and buildings remained undisturbed. Also, because the city was in a protected harbor the site was not greatly molested by the natural forces which have ravaged most shallow water sites.

Of the more than ten thousand vessels lost in the Western Hemisphere prior to 1870, more than 95% sank in shallow water of less than fifty feet. Since very few of these shallow sites enjoy the same immunity as Port Royal or the deeper Mediterranean sites from disturbing elements, just how much archaeological data can they furnish? Some archaeologists feel so little information of value can be obtained that it is fruitless to attempt any disciplined excavation of them. In some cases this is so; but certainly not always. Documentary sources can provide a lot of information about the colonial ships, their cargoes and the men who sailed them. However, there are no corresponding literary sources to shed light on the ancient ships found in the Mediterranean. In many instances underwater archaeologists may provide answers to such intriguing questions as how various ships were constructed and rigged, what anchors and armament they carried and what their cargoes were.

In the case of the average shallow water wreck, the archaeologist can only determine what cargo, anchors and armament the ship carried. As a result of the destruction of the ship itself virtually nothing remains of clues to a ship's construction or how and where she carried her stores, cargo and armaments. Consider briefly what happens to most ships wrecked in shallow water. Either immediately upon running aground or soon after, the vessel begins breaking up, even if wrecked in good weather. The superstructure of the old ships was the first to go. Being buoyant, it was often washed up on a beach or carried some distance from the main hull, spilling cannon and other objects along the way. Waves or currents eventually dispersed the ship's timbers and marine borers devoured them. In some cases ships' cargoes have been strewn over areas of several square miles and are intermingled with the cargoes and vestiges of other wrecks; sometimes of another period, making it very difficult to determine what belongs where. Quite clearly wrecks of this description are of less archaeological importance than those lying undisturbed in deep water, which are sealed historical containers.

Although stratigraphical levels are of prime importance on land sites, most of which encompass long periods of time, they are not always relevant or even obtainable on many underwater sites, especially those in shallow water. On deeper wrecks, particularly when more than one wreck lies on the same spot stratigraphy establishes what each ship carried. It is also very important on those deep wrecks where any portion of the hull remains because stratigraphy helps determine how it was con-



photography by Chuck Nicklin



Peter Throckmorton and George Bass used methods akin to those employed on land sites to record the Bronze Age shipwreck they excavated in the Mediterranean. The site was marked off on a grid and a thorough survey was made of position and stratigraphical level of artifacts and buildings.

structed. On some deep sites when a ship settled upright and intact, even though most of the wooden hull disappeared, the cargo may still lie in situ as it was stored on the ship. Stratigraphy in this case might aid in determining the sequence in which the ship stopped at various ports by establishing how the cargo items were stored if the newer cargo was stowed on top of cargo loaded earlier. However, heavier items would naturally be placed under lighter confusing the situation.

A number of archaeologists overestimate the importance of precisely recording the exact location, or establishing the horizontal relationship between every object discovered on a marine site. In regard to shallow, scattered wrecks, this practice is generally an unrewarding expenditure of time and effort. Plotting the position of some of the major finds will help show how the vessel broke apart and where the several components ended up. This aids in deciding what areas to give priority to in excavating. On the deeper wrecks it is far more important to make detailed records. In the case of a more or less intact ship the archaeologist may be able to actually reconstruct the ship from fragmentary pieces.

One of the first problems confronting an archaeologist on an underwater site is determining if it has definite merit or not. To be safe, each site should be treated as potentially important until it proves otherwise. A site that turns out to be a refuse site where an anchored ship's trash was heaved overboard is certainly not in the same category as one of Columbus' shipwrecks, but it may take days or even weeks of work to identify what a site is. Thus, the amateur underwater archaeologist should always seek help from experts to determine the importance of a find and to decide how to excavate it. What Flinders Petrie wrote more than sixty years ago is still valid:

"To suppose that excavation—one of the affairs which needs the widest knowledge—can be taken up by persons who are ignorant of most or all the technical requirements is a fatuity which has led, and still leads, to the most miserable catastrophes. Far better let things lie a few centuries longer underground, if they can be let alone, than repeat the vandalism of past ages without the excuse of being a barbarian."

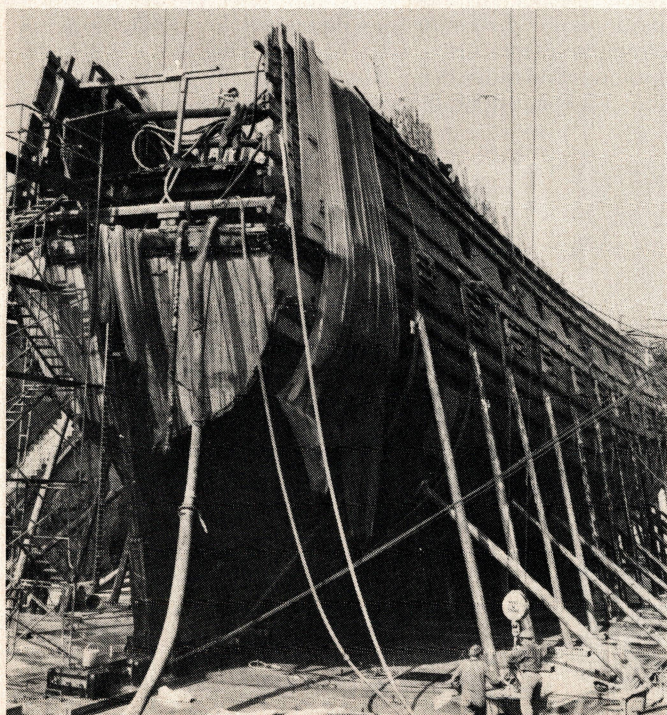
No two archaeologists will agree how old a site must be before being considered of archaeological importance. Many classical archaeologists feel a site must be more than five hundred years old to be of importance. While working in Israel several years ago, I was astonished to hear a couple of archaeologists state that a Crusader shipwreck from circa 1200

A.D. had been found but would not be excavated because it was too recent to be of interest! In the Western Hemisphere, if we accepted the dictionary definition of archaeology as "the study of antiquities" at face value, we would have virtually no underwater sites of interest because generally "antiquities" refers to objects dating before the Middle Ages.

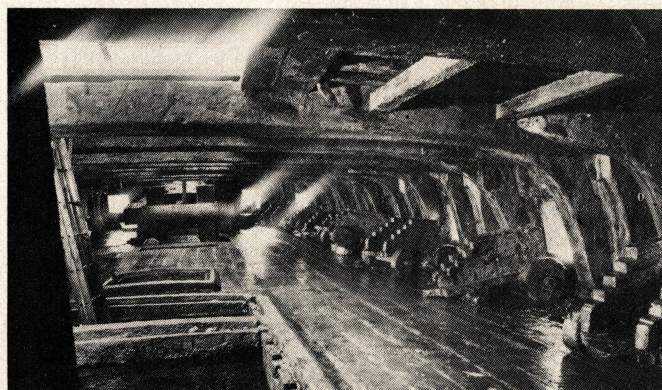
Let us rather say that any find that sheds light on man's past; how he lived, worked, traveled and how and what he constructed will have some archaeological significance, regardless of age. For practical purposes let us consider any artifact older than one hundred years of potential interest. This takes us back to an important time in shipping for it was the epoch of transition from sail to steam and from wooden hull to steel. More important, it was the time when the art of shipbuilding evolved into a science. Ships began to be built by plans, most of which are still on record, rather than by "rack of eye" by craftsmen who handed down their traditional techniques to their sons. As each year passes, modern technology makes yesterday's miracles obsolete and thus objects which are not necessarily very old, become things of the past and vanish.

Isolated finds of a single artifact can sometimes be of consequence as in the case of a recently discovered glass bottle dating from the mid-seventeenth century. This bottle, found underwater, bore the date 1654, but prior to its discovery, experts identifying similar bottles by their styles of manufacture had placed them between 1670 and 1680. The recovery of a pocket watch, evidently dropped overboard as a man rowed across an English river in the early 1600's has furnished a lot of information on early watchmaking. The discovery of a solitary anchor, seemingly unassociated with a wreck, might possibly prove to be an important clue in establishing that others had reached the New World before Columbus.

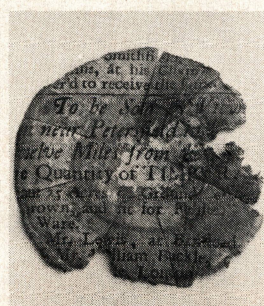
Underwater archaeology is a relatively new field and there are very few professional or full time archaeologists working. There are hundreds, even thousands of sites in lakes, rivers and seas which offer tremendous scope for the amateur underwater archaeologist. His contribution can be great, particularly if he takes the time and trouble to consult with professional experts and to work within the accepted guidelines of underwater archaeology. By the same token, his potential for total destruction of a site is equally great. The choice is his: to work patiently and carefully in a disciplined way and perhaps make valuable additions to the growing knowledge gained from underwater excavations or to rip a site apart like a barbarian.



photography courtesy of Maritime Museum and the Warship Vasa

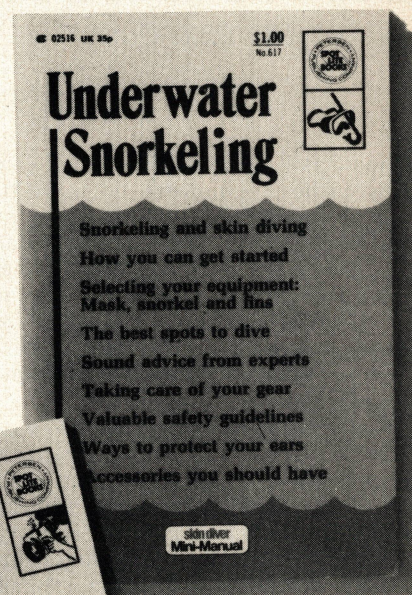
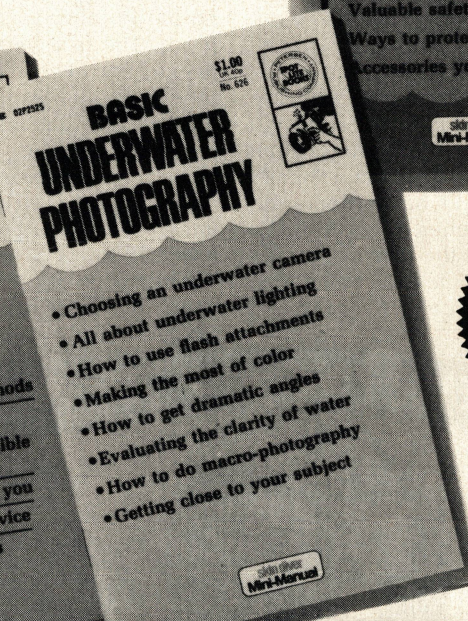
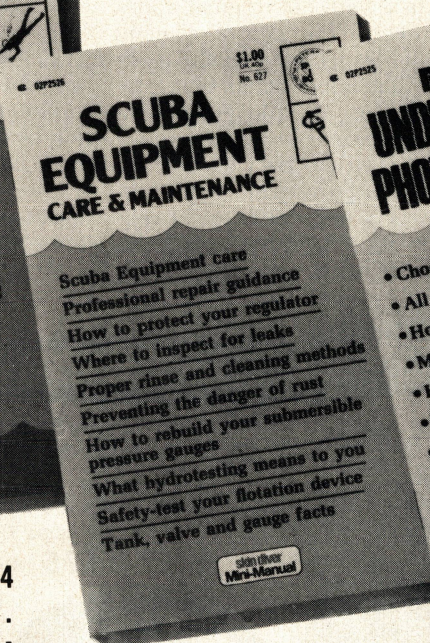
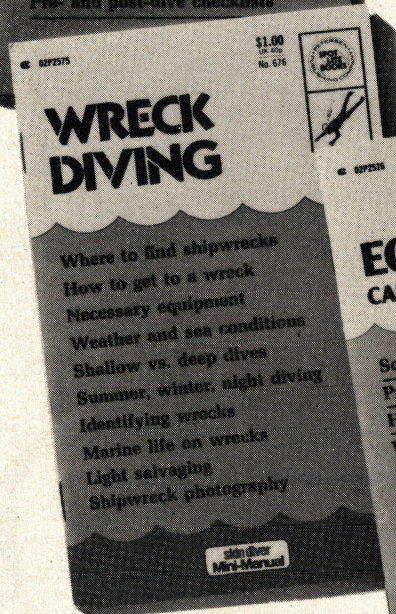
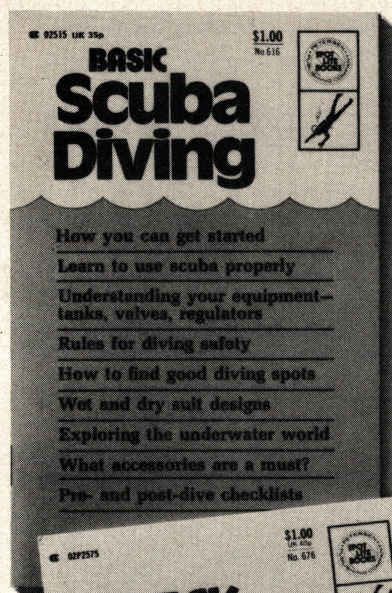


There are some normally ephemeral objects which have lasted better underwater than underground. The section of newspaper at right was used as packing between a gold watch and its case . . . in 1741. The wooden warship Vasa plunged to the bottom of Stockholm Harbor on August 10, 1628. Today she feels the sun on her original fittings.



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Shell Facts

By E. R. Cross

Shellfacts is designed for the collector who wishes to improve not only the quantity of shells in his collection but also the quality of those shells. Toward this basic purpose the column will provide nontechnical but scientifically accurate information on all aspects of shells and shelling. Shellfacts is your column. Watch Shellfacts for information you can use.

How can you reconcile your statement that Shellfacts is conservation oriented when you encourage shell collecting?

The above was the first question generated by Shellfacts. It was asked by a marine biologist who saw the rough draft of the first of the series in which I stated that Shellfacts would be conservation oriented but not a series of no-no's. We hope we can accent the reasons for certain actions or policies by collectors, either individually or collectively, so that

natural conservation becomes a shell collecting habit for all.

To me, natural conservation means the preservation of a habitat in the state or condition into which it has evolved over the millions of years that life forms have existed in that habitat. I feel that a major point many conservationists miss is that man, the predator, has been on earth for many millions of years. For most of those years he lived by and from the waters of the world and has taken a certain toll of molluscan life for food and used the shells for utilitarian purposes. In these millions of years, some forms of molluscan fauna have survived because they have adapted, to some extent, to predation by man. To remove this control of a population completely might cause as great an imbalance as over-predation.

An example of removing man-the-predator from an area, with the resultant creation of a population imbalance, has occurred in a small underwater park. Formerly this was a popular fishing place. The fish were not in great abundance; however, there were also many other forms of life including several types of seaweeds that helped break the water flow and sand erosion and provided a habitat for myriad species of small marine life. When the area became an underwater park, it was closed to the taking of all forms of sea life. Within a year the fish population had nearly doubled. With this increase, many of the food

items of the fish became scarce or extinct in the bay. Among the first things to disappear, or nearly so, were the various forms of seaweeds that had once been abundant. Suddenly the bay had lost its charm along with many forms of marine life that had lived in the formerly balanced ecosystem. Man-the-predator had kept the fish population in balance with other forms of life.

I do not mean to imply that conservation is not needed. Measures should be taken to preserve every environment in its natural state and natural balance. But it should be remembered that man has been part of the balancing system in the life cycles on earth for millions of years.

With this in mind, the do's and don't's in Shellfacts will be designed to help the collector understand some of the things that might contribute to keeping the molluscan population in balance with the rest of life in the ecosystem.

Shallow water collecting - The molluscan life forms in shallow water are the most abundant and the most colorful. They are also the easiest to reach by the casual collector. The term shallow water includes shore lines, bays, harbors, structures in the water such as piers, pilings and others, from the surface to moderate depths reached by good skin divers and moderate scuba diving. Mollusks living in this range of water depth vary from those found clinging to rocks or other objects just below low tide, to those

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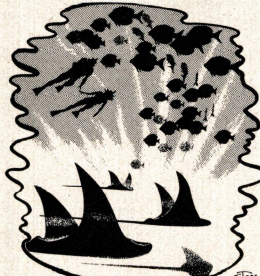
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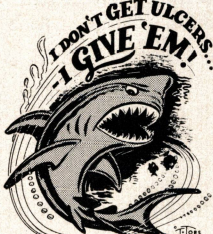


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found burrowed deeply in the mud at maximum depth.

At tidal level will be found the periwinkles (Littorinidae), top shells (Trochidae), rock shells (Purpurinae and Drupinae) and a large group of shells classed as limpets (Patellidae). Usually these animals are found in large numbers and the collector can be very selective, taking only the shell or two of each species in best condition.

Most of the mollusks listed above can be removed from the rocks or object to which they are clinging simply by pulling them free. The limpets are a different story. The best procedure for removing these sticky little animals is to slip a thin bladed knife or spatula under the shell, without previously touching the shell, and then quickly pry it off the rock or coral. If the shell is first touched, the animal will quickly clamp down and be almost impossible to remove without breaking the shell.

If you move or overturn rocks, driftwood, seaweed, etc., in searching for shells, be sure to replace these objects in their original position, regardless of whether you are in shallow or deep water. As explained in last month's Shellfacts, this is important. Marine growth living under the object may be killed because of light exposure or strong tides. Keep in mind the major conservation rule — leave things as you found them.

The sides of dock structures, pilings

and even barges and ships left at anchor for long periods of time are interesting sources of shells. I have collected cone shells, cowries, drupes, murex and strombs as well as several varieties of bivalves from pilings. Usually seaweed-like marine growths will be found attached to the structure in the shallower water. Run your hands through this carefully for shells.

A word of caution: in tropical and semitropical waters, hydrozoa forms are sometimes found on marine structures which inflict nematocyst stings on the unwary collector. Cotton gloves usually protect from these stinging cells. Be careful to avoid pulling the colonies loose, as this might allow the hydrozoa to drift around in the water and sting unprotected areas of the body. Usually the worst forms of stinging hydroids resemble small trees of black coral or ferns, and may reach a length of several inches; they sometimes appear to have tiny flowers on their branches.

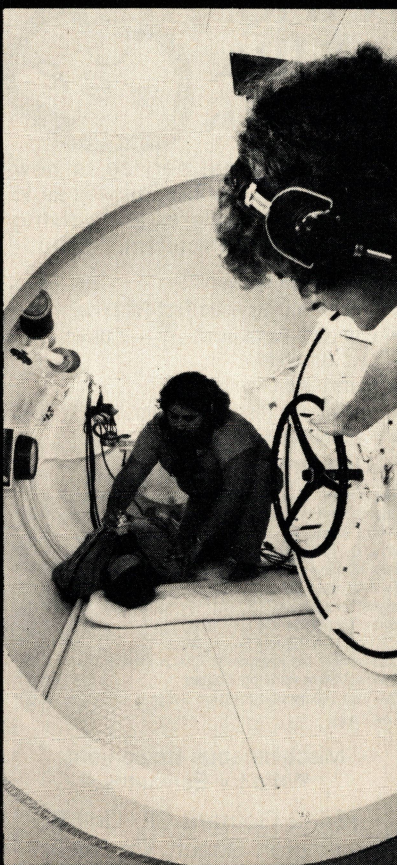
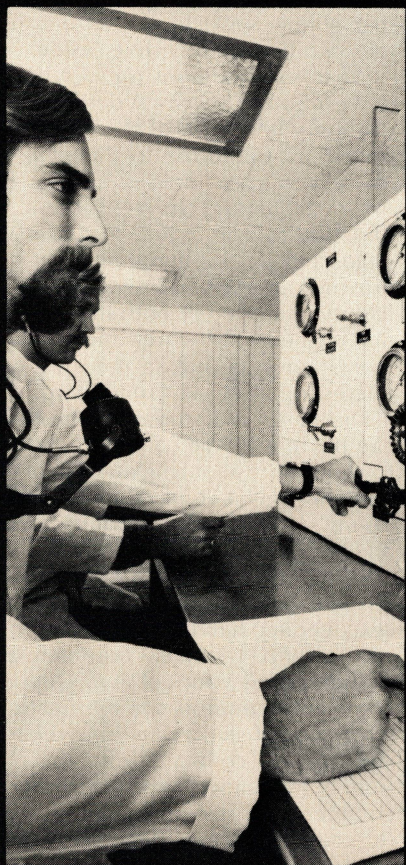
Certain mollusks like gravelly areas, often situated well below the low tide mark. These include the *Bussium* species, some of the cones, miters and many bivalves, to mention a few. To collect shells in a gravelly bottom, gently run your hands through the material in a ploughing movement. Watch for the shells to be turned up and choose the best few for your collection. Larger stones or objects can be turned over for

inspection and collection.

In searching through rubble, be alert for sea urchins that can inflict a painful wound with their sharp spines. Some sea urchins are tiny, less than an inch in diameter, with extremely thin spines.

A hand dredge is an excellent method of collecting from rubble. Swim the dredge down to the bottom and then drag the dredge through the loose material until full. Then, if skin diving, swim the dredge to the surface, wash the material through the water to remove fine silt and sort out the shells. If scuba diving, the washing and sorting can be done while still on the bottom. The shells are removed and the dredge again dragged through the loose rubble.

Sandy areas can be dredged in the same manner for their particular type of mollusks. Here most of the cone shells, augers, miters, tuns and many bivalves will be found. "Fanning" for shells in sandy areas is also productive. Use the flat of your hand and fan across the sand about two inches or so above the surface. This action causes the sand to wash up into the water. Shells in the sand are exposed and can be picked up. Do not use large objects such as flippers or scoop-like tools to fan for shells in small sand pockets. Too large an object stirs up sand to such an extent that it might be transported by currents out of the area, thus destroying a small, fragile habitat. Sand



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Shell Facts

can also be sifted through the hands to detect shells.

Mollusks are likely to be found on, under, in or attached to almost anything, anywhere. Several mollusks live in and on seaweed. One beautiful and interesting group in this habitat are the *Calliostoma* species. Other shells live associated with sponges and may limit their habitat to a single species of sponge. Still others are found on coral. The "flamingo tongue" of Florida and the West Indies is found on the sea whip. Some mollusks are found associated with sea urchins, sea cucumbers and polyp-like zanthoids. A species found in Hawaii, *Thyca crystallina* Gould, is found parasitic to two starfish (*Linckia multifora* and *Linckia guildingii*).

One of the interesting things about *Thyca crystallina* is that the male of the species lives its entire life within the shell of the much larger female. The foot of this unusual species has been modified in such a manner that it can drill a hole through the arm, or ray, of the starfish into its main artery. *Thyca crystallina* then simply sucks the food from the artery into its own digestive system.

What is a good book for identification of West Coast shells? - A definitive book dealing with shells of the West Coast, from Baja California to Panama, is A. Myra Keen's *Sea Shells of Tropical West America* (Stanford University Press, Stanford, Calif.) This book, in about 1000 pages and several hundred illustrations, provides an excellent reference for collectors interested in both the identification of shells of this area and in learning more about the habitat and life of the interesting mollusks found there.

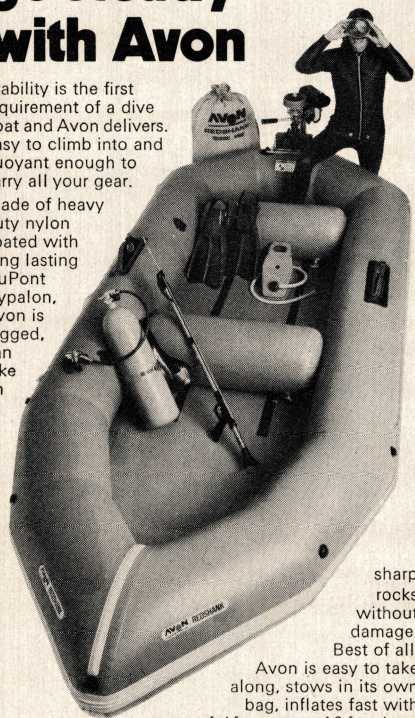
For the serious student of the Molluscan phylum, or the collector who wants to know more about the makeup of shells and animals he collects, try Wilbur and Young's *Physiology of Mollusca*, Vol. I and Vol. II (Academic Press, N.Y.) These two volumes treat every phase of the physiology of mollusks from senses to sex, feeding habits, respiration, blood and so forth. Technical but interesting.

Shellfacts is your column. Questions, comments, requests for information or ID photos of shells, anything related to shells or shell collecting will be welcome from SDM readers. For each question, comment, suggestion or photo used in this column, the writer will receive a shell from Hawaii. Write to SHELLFACTS % Skin Diver Magazine.

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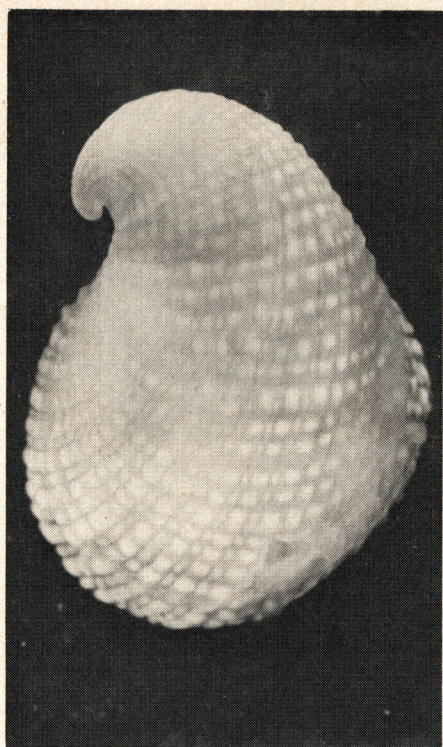
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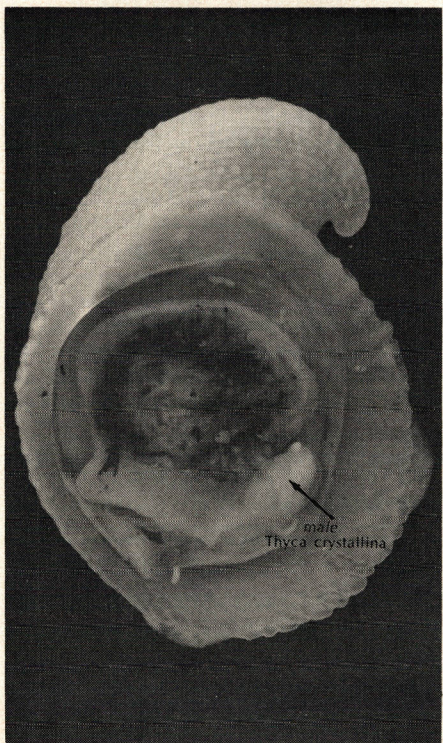
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An enlarged view of a 20mm specimen of *Thyca crystallina*, above, shows sculp-turing on the dorsal side of the shell. The tiny male of the species is shown below attached internally to the reproductive organ of the female. The male spends its entire life inside the shell of the female.

Smithsonian Institute photos



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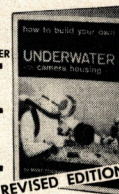
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GLOVE TALKING AT GUAM BY ANNETTE DONNER

There's a form of underwater communication that works every time, needs no batteries, and which is carried with you on all dives. It's called glove talking, and involves the simple principle of using your glove as an air chamber to



transmit sound. Mitch Warner, NAUI instructor at Coral Reef Marine Center, Agana, Guam, developed this technique after searching around for an easy, convenient form of communication under. He found that glove talking is cheap, simple and quickly mastered.

To try glove talking, remove one glove and fold the cuff back. Remove your regulator, then place the glove over your mouth firmly so no air escapes around the edges. Inflate the glove slightly, then proceed to talk. The glove is used essentially as a "rebreather;" the air you exhale while talking can be rebreathed and used to continue talking without replacing your regulator to get more air.

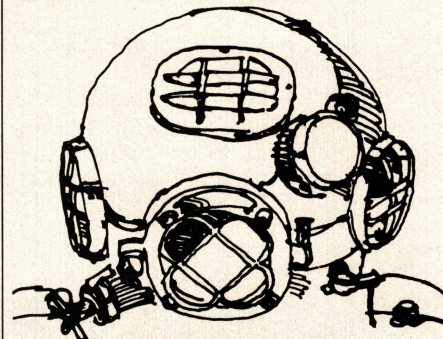
Pronounce each word slowly and carefully while glove talking, and use a normal tone of voice. Also, be sure you have a tight seal so your words do not go up in bubbles around the edge of the cuff. Hold the glove close to the ear of the listener: when done correctly, glove talking is clear and easily understood.

The cotton garden variety of glove works best for glove talking — neoprene gloves do not work as well. The sound can be heard through a wet suit hood, though, and we teach the technique to all our basic students and use it during our five ocean training dives. It's fun for the students as well as a confidence builder as it adds to exercises which involve taking the regulator out of their mouths.

There is so much marine life around Guam that one of our training dives is almost exclusively for marine life orientation, during which we use glove talking to explain the different forms of life we encounter. We have also found that glove talking can help quiet an anxious student. Noticing a concerned face underwater, an instructor might not be able to recognize the problem. A quick word of question or assurance with the glove can be just the thing the student needs.

We hope glove talking will be an enjoyable addition to your diving. For more information contact: Coral Reef Marine Center, P.O. Box 2792, Agana, Guam.

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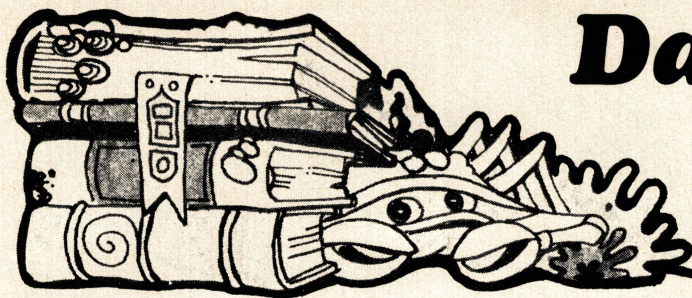
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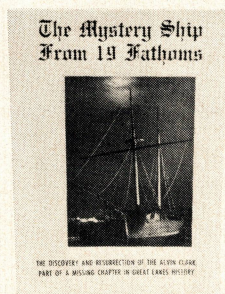
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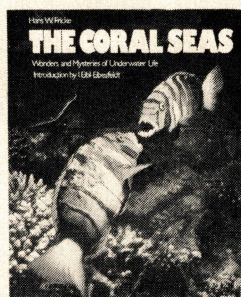


Davy Jones Review

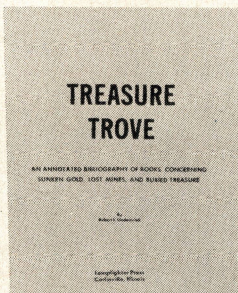
THE MYSTERY SHIP FROM 19 FATHOMS — by Thomas Avery/\$3.95. It was by chance that sport diver Frank Hoffmann found the virgin wreck of a 100 year old schooner in Green Bay, Michigan. It was through will and determination that he and a small group of loyal friends raised the ship intact and restored it for public exhibit. Page by page, his amazing story unfolds in this enthralling book. Avery Color Studios, Au Train, MI 49806.



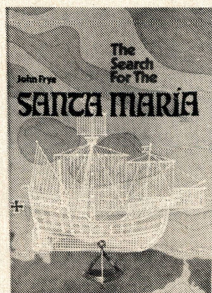
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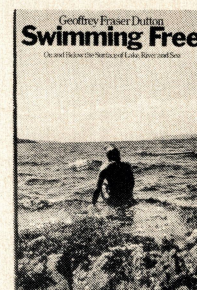
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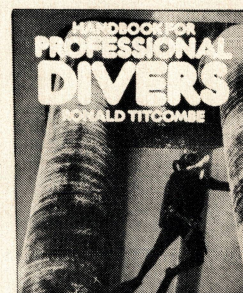
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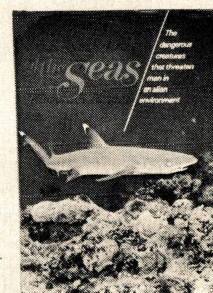
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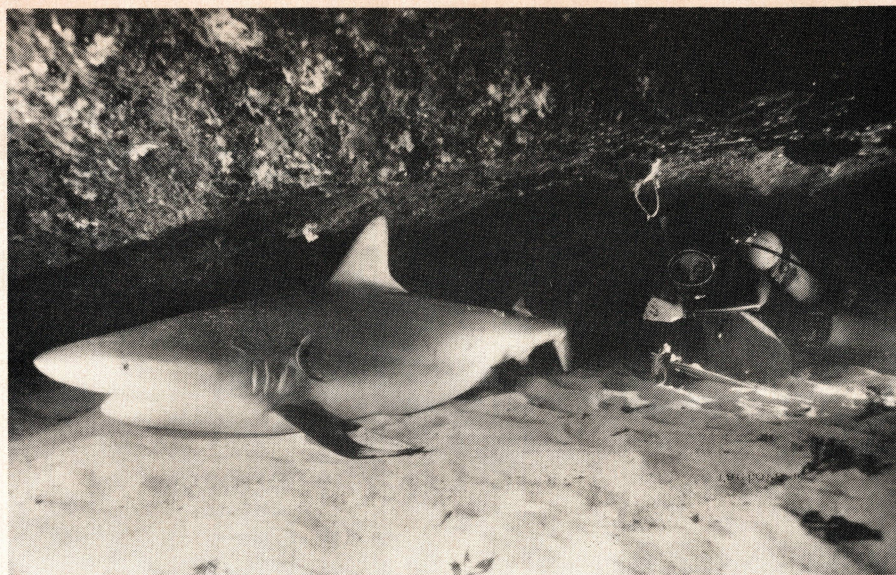
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SLEEPING SHARKS

Dr. Eugenie Clark, professor of zoology at the University of Maryland, first heard of the "sleeping sharks of Mexico" three years ago. In 1973, guided by Carlos Garcia, the young diver who discovered the caves, and Ramon Bravo, one of Mexico's leading naturalists and underwater photographers, Dr. Clark saw her first immobile *Carcharhinus* sharks. Only their gills were pumping, most unusual for fishes that were thought to swim from birth to death.

The shark's lethargic state enabled divers to touch and even lift them gently. Determined to find out whether the fish were in a true state of sleep, Dr. Clark returned to study them in May, 1974. Her work is supported by National Geographic Society and Mexican government.

Dr. Clark speculates that water conditions and the remora — small sucker fish that attach themselves to sharks and clean their hosts of parasites — play an important part in drawing the predators to the cave. At certain times the salt content of the water drops in the cave, weakening the parasites on the sharks, and enabling the remora to remove them more easily. This and the shark's stillness enable the remora to clean it more efficiently. In effect, the cave serves as a kind of cleaning station.



photograph © National Geographic Society

Dr. Eugenie Clark investigates the mysterious actions of sharks found in caves near Isla Mujeres. These sharks seem to sleep! Dr. Clark has discovered several factors that may explain this phenomenon, including chemical composition of the caves' water.

Fresh water, seeping from the sandy floor of the cave and lowering the salinity, may cause the accumulation of some anesthetizing chemical such as magnesium sulphate, which could react on the sharks. The large quantities of dissolved oxygen discovered in the water,

most unusual in a dead-end cave, would enable the fish to lie still for long periods of time without suffering oxygen deficiency. Water samples collected by the scientists are being analyzed by chemists who hope to unravel the mystery of the drugged sharks. ➤

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The International Underwater Explorers Society (UNEXSO) has two diving and sightseeing safaris to Hawaii



scheduled for 1975. The 10 day safaris will depart May 16 and August 21, and will cost \$995, plus air fare. Arnold Stollar and Roy Damron will be the UNEXSO divemasters. All the islands will be visited for diving and also for sightseeing. For more information contact: UNEXSO, 1148 N.E. 48th Street, Pompano Beach, Florida 33064.

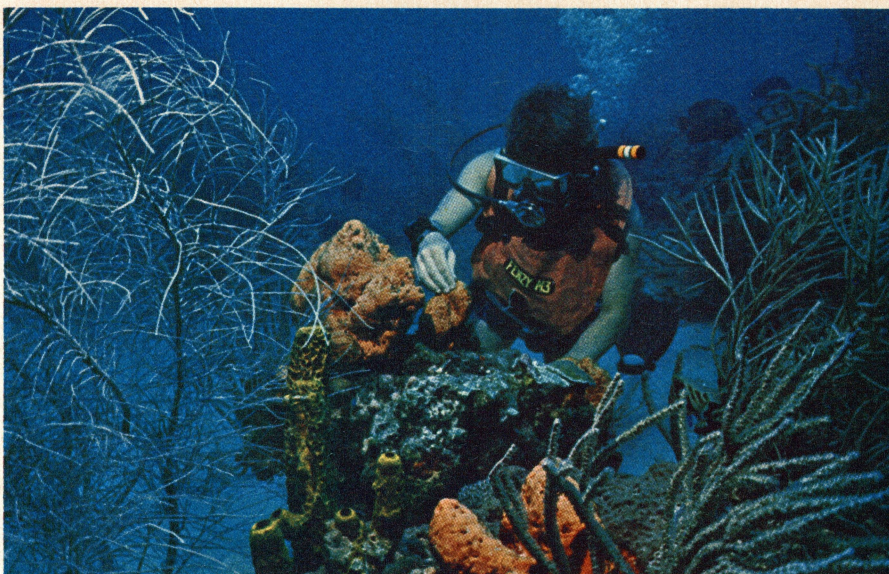
BRITISH COLUMBIA TOURS

Black Tusk Touring and Guide Service has started tours to two new areas in British Columbia, Canada — the west coast of Vancouver Island, and the Queen Charlotte Islands. All tours will be aboard the 72 foot M.V. *Santa Rita* to make unexplored diving areas accessible for guests. Air will be available on the boat for unlimited diving, but guests must bring their own diving gear or rent gear in Vancouver. Arrangements have been made with a dive shop to rent all basic gear at special discount prices for these tours.

The seven day tours to the west coast of Vancouver Island will depart June 7 and August 2, 1975. This area is a paradise for wreck divers as at least 240 ships foundered on the rocky coast there. Before the new navigational aids came into use, in fact, so many ships got into trouble the Canadian Government decided to build a special lifesaving trail to the coast because rough seas often made it inaccessible for smaller boats. Bring your goodie bags for this trip, which costs \$263 per person, including all food and accommodations.

The 10 day tours to Queen Charlotte Islands will depart June 28 and August 23, 1975. More than 150 islands make up the Queen Charlotte group, and each is surrounded by fascinating marine life including an abundance of seals and whales. This area is the home of the well known Haida Indians who built the gigantic totem poles. Although most of the Indians have disappeared now, the beauty of the area will make an unforgettable holiday. All food and accommodations will be provided on these trips for \$360 per person.

For more information about these tours contact: Black Tusk Touring and Guide Service, Ltd., 107-115 East Keith Road, North Vancouver, B.C., Canada V7L 1V1.



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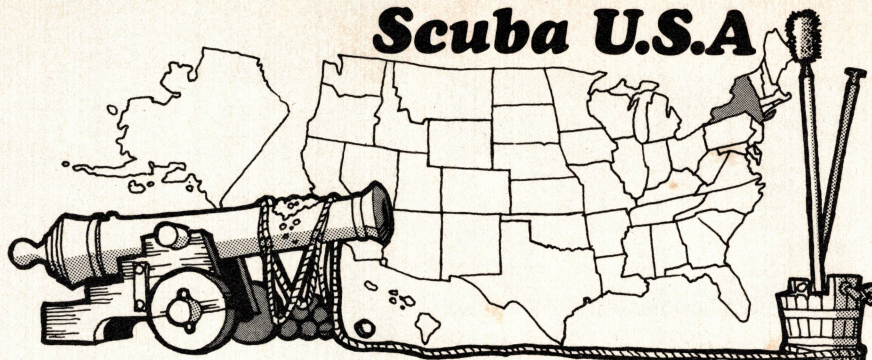
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ABOVE THE FALLS—THE UPPER NIAGARA

BY JEFFREY M. GEIS

The Niagara River offers much more than a spectacular waterfall. Some local divers compare it to a warehouse of historical treasures where almost any dive proves to be rewarding. The river, bordering the city of Buffalo, was known to be an important factor in early industrial expansion and the developing commercial trade. Ferries and old lake freighters churned through the river channels and pleasure boating soon became popular while the river bottom quietly collected the evidence of the travels.

Old glass bottles seem to be the usual find among the local divers. It is relatively common to find soda pop, beer or medicine bottles dating back to the mid-1800s; often not more than 75 yards from shore. The bottles, usually found in good condition, are easily marketable to local collectors, but many divers regard the glassware they bring up as priceless and not for sale. Yet old bottles are not the only finds. Occasionally an old fluked anchor is raised, and intact cases of bootlegged whiskey, jettisoned during the Prohibition Era, are often talked about whenever divers swap stories.

Diving the mighty Niagara is a thrill even if the day ends without souvenirs. The upper river, with its two branches, is approximately 30 miles long, and in its narrow sections it can run in excess of five knots. Water depths range to 35 feet, with normal visibility being approximately 15 to 20 feet. Heavy rains or winds can leave the water murky, but pollution, which was a major problem a few years ago, has been effectively controlled through vigorous commercial and civic efforts. In some sections the river grasses are very dense and the fish population, mostly perch and sheephead, is on the increase.

Boat diving with lifelines is the most practical and effective method for exploring the river. It provides the safety and

desired degree of mobility the Niagara requires. Drift diving with a float is also a common practice, but mobility and accessible diving areas are limited by the high percentage of privately owned shoreline property. Boat launching and servicing facilities are quite adequate along the river, and local pleasure boating is very common.

Heavy commercial navigation of the river is present but not regular, and the channels are well charted. On weekends during the normal boating season (May to October), however, winds and heavy pleasure traffic often combine to produce a severe "chop" in the narrow, swifter sections of the river. Inexperienced divers should avoid these sections. Wet suits are recommended, even through the summer months, as some currents may dip to a chilly 55 degrees.

There are about six major dive shops in the upper Niagara area, all of which offer quality merchandise and reputable service and advice. Local recompression chambers are available in the case of emergencies, but it is recommended that the Coast Guard or the Erie County Sheriff's Office be consulted to determine which facilities are operable prior to planning dives which will approach or exceed decompression limits.

The Niagara diving conditions are generally good, and if normal safety procedures are followed and if lifelines are used between paired divers and their buoy or boat, no major problems should develop. It should be noted that entry into the water and all navigation is prohibited at points within approximately two miles of the Niagara Falls . . . for obvious reasons. The area of restriction is marked and charted. At the time of this writing, no guided tours of the upper Niagara are known to be offered, but further help or advice can be obtained from local dive shop proprietors.

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swore were mermaids.

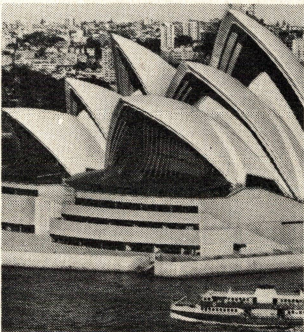
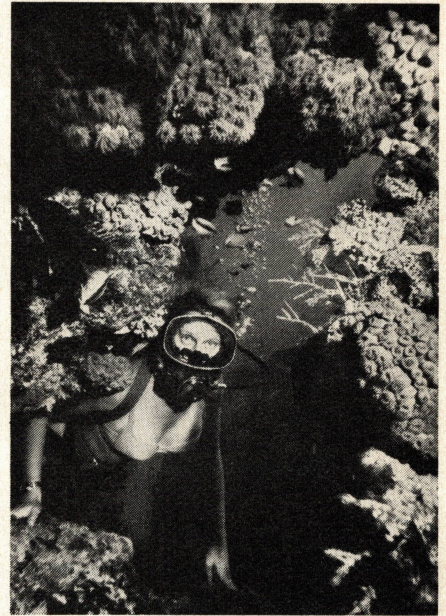
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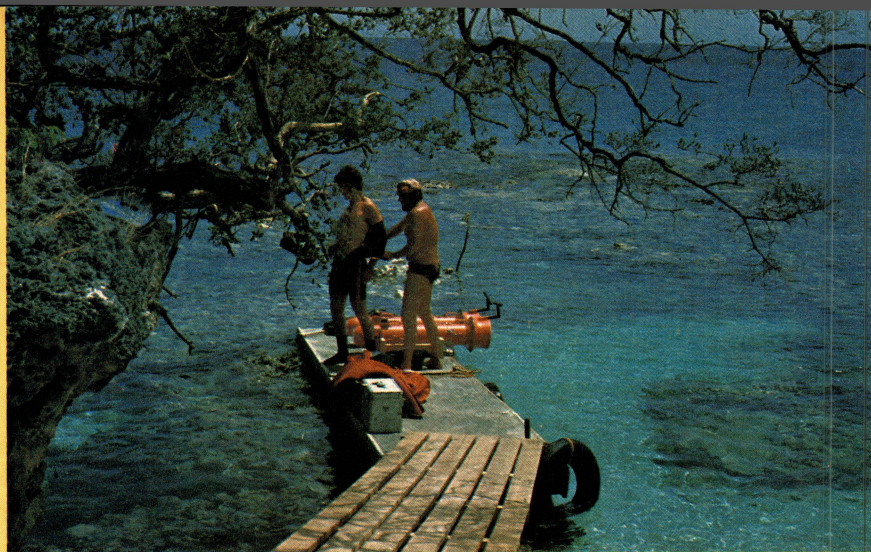
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Captain Don Stewart assists a guest to remove his scuba gear after a DPV dive at Nukove. The newly built pier is part of Capt. Don's recently erected Nukove campsite facilities. Below, a tiny but colorful communal shrimp lives in symbiotic bliss with a stinging anemone on Town Reef. Within sight of downtown Kralendijk, this shallow reef area is a macro photographer's supermarket of miniature reef creatures.



BONAIRE

A Paradise Preserved

By Paul J. Tzimoulis

One would think any dive resort popular enough to attract 3000 visitors annually would be pretty well dived out by now. Not true in Bonaire! Although small by comparison with other Caribbean islands, this delightful Dutch paradise is blessed with remarkably resilient coral reefs rich with colorful marine life and teeming with fish.

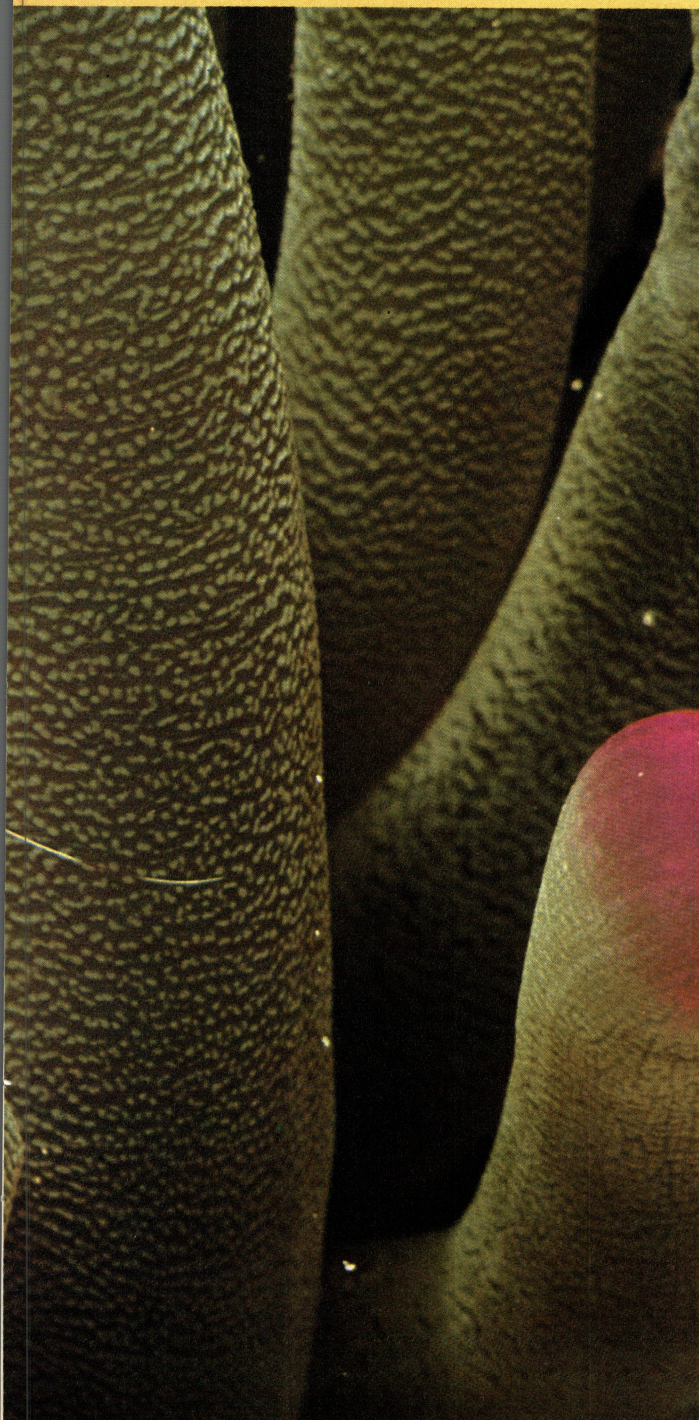
In recent years, Bonaire has skyrocketed to international fame as one of the hottest dive spots in the southern Caribbean. Divers from all over the world, and especially the U.S., have been flocking to this remote isle for underwater photography, reef exploration, fish watching, or just casual water recreation. Many return for a second, third, or even fourth visit simply because the diving is good and there's so much to be seen. One never seems to grow tired or bored with Bonaire's undersea diversity.

Yet with all of this accelerated diver traffic, Bonaire continues to remain as beautiful and as natural as ever. Instead of becoming depleted or barren, the offshore reefs seem to grow better with each succeeding year. Fish populations are increasing, new marine species are being found and identified, and more beautiful reefs are being discovered almost monthly. Bonaire is in the midst of a golden era of undersea pioneering.

What is the reason for this unique evolution, this phenomenon in tourism development? The answer is two-fold. A good deal of credit goes to the visionary efforts of Capt. Don Stewart and the wisdom of the island's government officials. At the enthusiastic urging of Stewart, the Bonaire Government declared the reefs and surrounding waters a national undersea reserve: spearfishing, shelling, or the removal of corals is prohibited. The island's natural undersea beauty was preserved and protected *before* any destruction had begun.

In concert with this initial conservation move, Bonaire has managed to keep pace with the growing influx of underwater visitors. Scuba facilities have expanded several times over, dive trips are organized with streamlined efficiency, and dive spots are regularly rotated so that no one area is over-used or over-dived. To date, some 60 to 80 excellent dive spots have been located along a 26 mile stretch of Bonaire's leeward coast, thus offering an endless challenge for the visiting explorer. In some spots you could spend the entire day diving without ever seeing another diving party.

A great deal has changed since SKIN DIVER's last article (Nov. '73) about Bonaire's diving facilities. The focal point for all the action is the Aquaventure Dive Center, one of the biggest and busiest full-service dive facilities in the entire Caribbean. Located on a crowded one and a half acre plot of the Hotel Bonaire beachfront, this incredible operation re-



photography by Author





A scuba diver encounters a school of foraging creole wrasse during an early morning dive. Captain Don Stewart conducts his scuba courses to meet YMCA certification requirements. At right, a coral-encrusted anchor silently marks the anchorage of the seventeenth century Dutch Salt Fleet off Bonaire.



sembles a western boom town during the Gold Rush days! Divers are coming and going at all times of day, with dive guides shouting and two air compressors going full blast.

The dive shop area has tripled in size, now enlarged 3800 square feet. The wash and rinse tanks for scuba gear have been moved inside and away from the sun. A freshwater shower and drinking fountain have been added. The tank storage area has also been enlarged to hold 120 rental tanks, and more shelves have been added for newly built gear "tote boxes." Two big compressors are pumping almost all of the time and a third is kept on standby. More storage cylinders have been added to the air bank, increasing the storage capacity to a staggering 7180 cubic feet of air — enough to fill 100 scuba tanks without ever switching on a compressor!

Aquaventure has also expanded personnel considerably, with three certified instructors and three underwater guides on hand to handle the guests' needs. Although still heavily involved in daily reef trips, Capt. Don's fast-paced 16 hour day is becoming increasingly filled with the demands of a highly successful and rapidly growing business. Bruce Bowker conducts much of the daily scuba training sessions, while Adi handles some of the private lesson requests. Ebo, Adi, and Basillio conduct most of the reef trips, while Nick serves as quartermaster in charge of scuba gear check-outs and returns.

Under the very capable management of Basillio, Aquaventure has doubled the size of its dive boat fleet, with four craft operating daily in addition to Capt. Don's specially designed

"dive truck." The dive center schedules a minimum of six dive trips daily, with groups going to three different locations simultaneously. Morning trips depart at 9:30 a.m. and afternoon trips leave at 2:30 p.m. Night dives are usually scheduled on Thursdays at 9:30 p.m. Dawn dives and twilight dives are scheduled on an impromptu basis, depending on the demand.

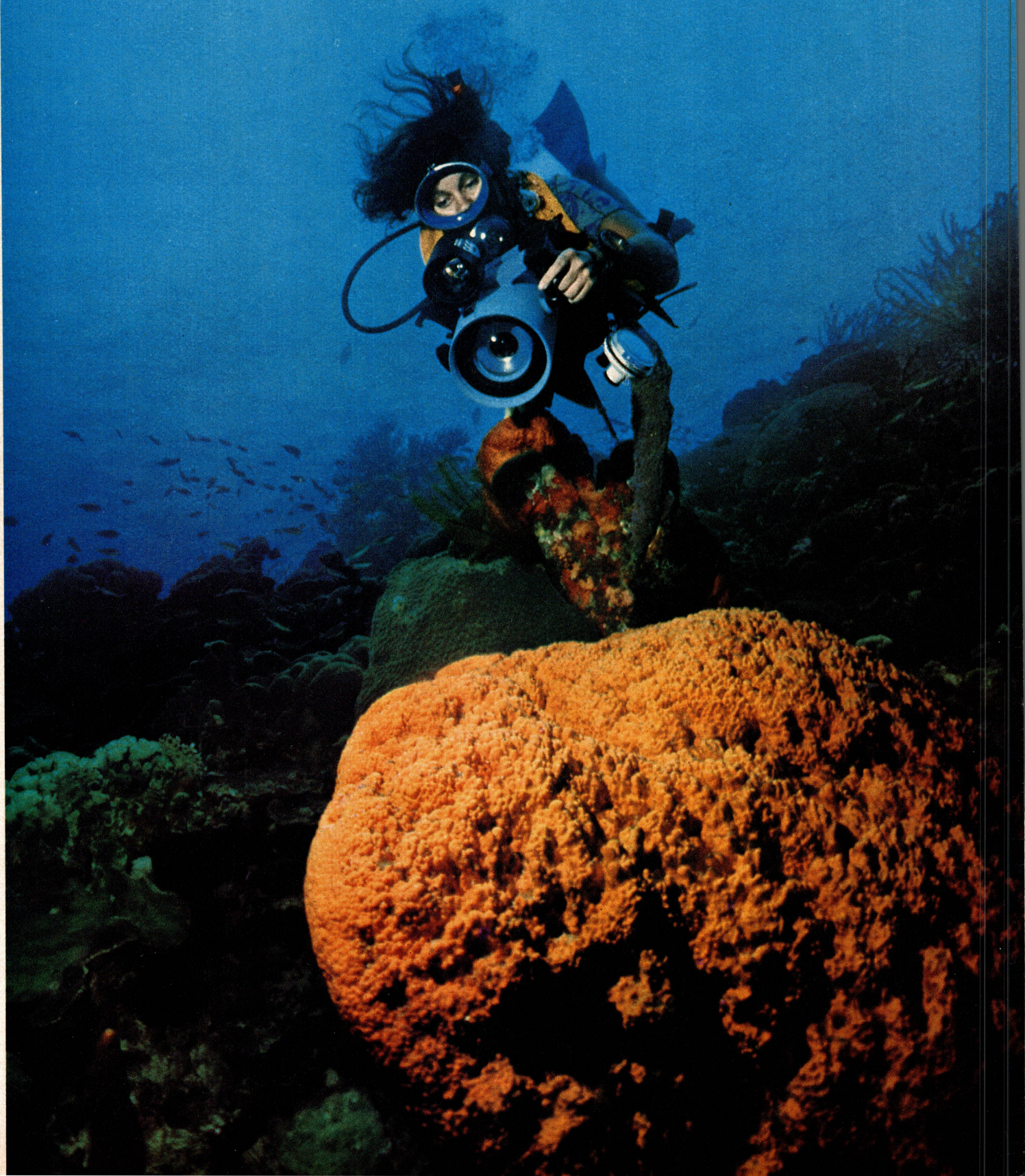
At present, there is very little construction at the Nukove outpost. There's just a small clearing for parking the dive truck, a small wooden pier, and a dive boat moored in the cove. Yet with meager beginning, Capt. Don has opened up another 12 miles of virgin coral reefs for diving. It will probably take a couple of years to explore it all.

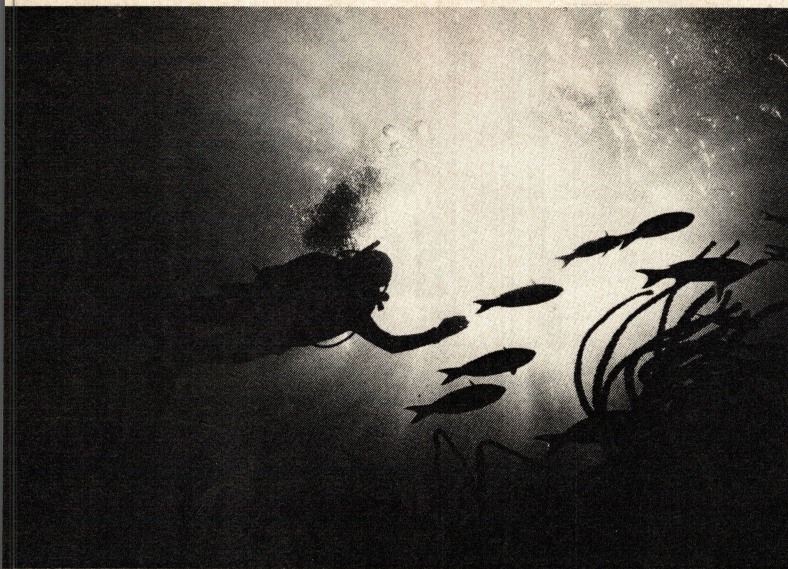
Once a week, Capt. Don packs the dive truck full with food, scuba tanks and guests, and sets off for an all-day dive trip and beach picnic at Nukove. It's usually the highlight of the week's activities, and a complete departure from the normal routine. Guests usually dive two tanks of air, plus do a lot of snorkeling.

The trip to Nukove takes anywhere from 45 minutes to an hour by truck on dirt roads and wooded trails. But it's more than worth it to make the bumpy journey, for it's a thrilling sight to view such an undisturbed scene of natural beauty. You feel completely cut off from the civilized world, seemingly transported backward to another century when perhaps Columbus viewed the very same scene.

Although Bonaire has rocketed upward in diving popularity, it has managed to preserve and perpetuate the natural under-sea beauty which first attracted divers. Admittedly, Bonaire is

A Paradise Preserved





An underwater photographer descends Forest Reef, passing one of the many giant orange sponges which grow there. Another diver swims with creole wrasse, while an Aquaventure guest cruises through a large school of sardines.

changing, but most of its changes are for the good. There is far more variety and diving convenience than ever dreamed possible. And in spite of its increased popularity, the prices for diving have remained reasonable. If you've never dived Bonaire, you'll be pleasantly surprised at what you've been missing. And if you've already been there, try it again . . . there's always something new happening in Bonaire!

For more information concerning ALM and KLM flights, Hotel Bonaire accommodations and Aquaventure reservations, contact their New York representative: Bill Keilman, Lisind International Travel, 609 Fifth Avenue, Suite 907, New York, New York 10017. If you're in a hurry, call: (212) 421-8771. Lisind International has put together a very attractive scuba diver's package for a one week vacation. They also arrange special group trips for dive clubs, dive shops, and instructor check-out trips.

How does Capt. Don keep track of such a tremendous assortment of guests and dive groups? The key to his success lies in his unique invention of an organizational facility which he calls Dive Alley. Basically, it is a series of blackboards mounted on the wall of the alleyway between the dive shop and the bathhouse next door. Each morning Capt. Don or one of the dive guides lists the day's dive schedule on these blackboards, one dive spot per board.

The Dive Alley announcements carry such pertinent data as the name of the spot, range of depths, name of guide, type of undersea terrain, time of departure, degree of skill required for the dive, name of boat or truck, and often a sketch of the reef profile. A specific number of open squares are drawn on the blackboard, indicating the number of spaces available on that particular trip. A guest signs up for the trip by simply filling in one of the open spaces with his scuba tank number (every tank is identified by number). When the spaces are filled, the trip is full, and the guest must choose an alternate trip. Trip sign-ups go on automatically and most groups move along smoothly, departing on time. It is an ingeniously simple device but has done much to eliminate the normal confusion and lack of communication one might expect.

Since Bonaire enjoys an exceptionally high percentage of repeat visitors, Capt. Don has instituted a new policy which he calls the Golden Tank program. Repeat Aquaventure customers (returning to the island for a second, third, or fourth visit) are given their first dive trip on a complimentary basis. Also,

some of Capt. Don's new and more exciting dive spots are reserved for Golden Tank divers only, thus assuring returning guests of some very exciting trips. A similar policy has been established for snorkelers, called the Golden Snorkel program.

One of the old traditions which has grown even more popular in recent months is the Magic Lantern, the Wednesday evening film and slide show gathering. Usually from 9:30 p.m. to midnight, hotel guests and resident divers spend a few sociable hours showing their latest underwater films and color slides taken on previous Bonaire visits. The bar stays open until the last picture has been shown.

While Aquaventure continues to grow and add new services, the adjacent Hotel Bonaire is also moving at a lively pace. Many of the rooms have been renovated, service has improved, and a new addition is being built. Also good news for divers is the hotel's acquisition of the Bonaire Bungalows on the adjoining property. Now families and dive clubs can rent private bungalow accommodations at more economical rates, while still enjoying the dining and grounds privileges of the Hotel Bonaire. You can now choose from a wide variety of room accommodations ranging from a single room rate of \$18 per night to as little as \$9 per night for a group (four people) rate bungalow. Prices quoted are 1975 summer rates.

But what about the diver who still seeks the solitude and serenity of the unexplored Caribbean? Is Bonaire overrun with divers? Are there no challenges left for the pioneering explorer? Quite the contrary. More than 60 percent of Bonaire's reefs are still unexplored and uncharted. One can still find complete seclusion and that special "closeness" with nature which few Caribbean islands can offer.

A pioneering spirit himself, Capt. Don has been careful not to overlook the needs of that special breed of diver that yearns for the wide open spaces. With this need in mind, he has recently announced the opening of Aquaventure's second (and very different) facility. Located at the extreme western end of the island, Nukove is an outpost in the natural wilderness of Bonaire's undeveloped west coast. The camp site is perched atop a limestone bluff overlooking miles of virgin reefs, secluded beaches, and open sea. The area remains uninhabited, except for wild parrots and iguanas. It's the kind of place which would have made Robinson Crusoe feel very much at home. 



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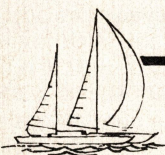
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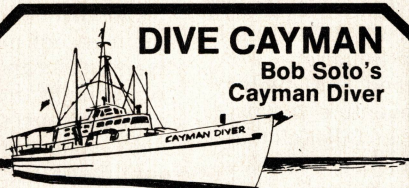
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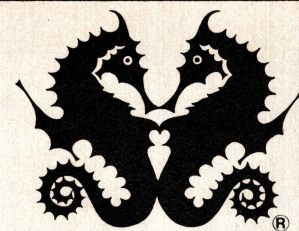
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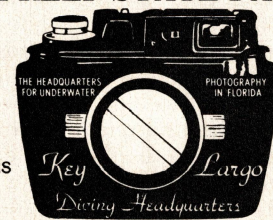
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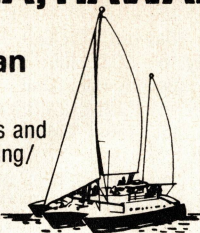
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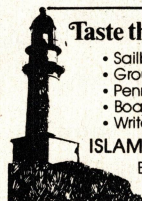
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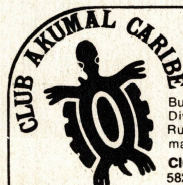
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Dive Tour News



- Mar. 1, 15 — SOUTH CAICOS, BWI — 7 days, George & Bettye Tomasi, NMU Scuba School, Marquette, Mich.
- Mar. 1 — CAYMAN ISLANDS — 7 days, See & Sea Travel, San Francisco, Calif.
- Mar. 7, 14, 21, 28 — BONAIRE — 8 days, Lisind Int'l, New York, N.Y.
- Mar. 8, 22 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Mar. 8 — COZUMEL/YUCATAN — 7 days, See & Sea Travel, San Francisco, Calif.
- Mar. 9, 23 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- Mar. 10, 21 — BIMINI — 7 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- Mar. 14—COZUMEL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Mar. 15 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Mar. 22 — BIMINI — 8 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
- Mar. 24, 29 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Mar. 29 — CAYMAN ISLANDS — 7 days, See & Sea Travel, San Francisco, Calif.
- Mar. 29 — AFRICA/INDIAN OCEAN — 23 days, C. Roessler, See & Sea Travel, San Francisco.
- Apr. 4, 11, 18, 25 — BONAIRE — 8 days, Lisind Int'l, New York, N.Y.
- Apr. 5, 19 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Apr. 5 — COZUMEL/YUCATAN — 7 days, See & Sea Travel, San Francisco, Calif.
- Apr. 5 — BIMINI — 8 days, Lee Turcotte, Atlantis Safaris, Miami Shores, Fla.
- Apr. 11—COZUMEL/AKUMAL—8 days Sunland Int'l Tours, Beverly Hills, Calif.
- Apr. 12, 21 — BIMINI — 7 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- Apr. 13, 27 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Apr. 14—CABO SAN LUCAS—5 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Apr. 19 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Apr. 19 — BONAIRE/CURACAO — 8 days, See & Sea Travel, San Francisco, Calif.
- Apr. 20, 27 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- Apr. 26 — CAYMAN ISLANDS — 7 days, See & Sea Travel, San Francisco, Calif.
- Apr. 29—CARTAGENA, COLOMBIA—10 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Apr. 29 — TORTOLA, BVI — 13 days, Trimarine Boat Co. Ltd., St. Thomas, Virgin Islands
- May 2, 9, 16, 23, 30 — BONAIRE — 8 days, Lisind Int'l, New York, N.Y.
- May 3 — AQABA, JORDAN — 14 days, Carl Roessler, See & Sea, San Francisco, Calif.
- May 3 — COZUMEL/YUCATAN — 7 days, See & Sea Travel, San Francisco, Calif.
- May 10 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- May 10 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- May 11, 25 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- May 12, 23 — FREEPORT — 7 days, Skeet LaChance, Adv. Cruises, Ft. Lauderdale, Fla.

- May 13, 27 — TORTOLA, BVI — 13 days, Trimarine Boat Co. Ltd., St. Thomas, Virgin Islands
- May 16 — HAWAII — 10 days, Arnold Stollar & Roy Damron, UNEXSO, Pompano Beach, Fla.
- May 16—COZUMEL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
- May 16—CHINCHORRO REEF—13 days, Sunland Int'l Tours, Beverly Hills, Calif.
- May 24 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- May 24 — CAYMAN ISLANDS — 7 days, See & Sea Travel, San Francisco, Calif.
- May 24 — BONAIRE/CURACAO — 8 days, See & Sea Travel, San Francisco, Calif.
- June 6, 13, 20, 27 — BONAIRE — 8 days, Lisind Int'l, New York, N.Y.
- June 7 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- June 7, 28 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- June 7 — COZUMEL/YUCATAN — 7 days, See & Sea Travel, San Francisco, Calif.
- June 8, 22, 30 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- June 10, 24—TORTOLA, BVI — 13 days, Trimarine Boat Co. Ltd., St. Thomas, Virgin Islands
- June 10 — BIMINI — 10 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- June 11 — GALAPAGOS ISLANDS — 17 days, Stan Waterman, See & Sea Travel, San Francisco.
- June 12 — GALAPAGOS — 24 days, Sierra Club Outings, San Francisco, Calif.
- June 15, 27 — GRAND CAYMAN — 12 days, Sierra Club Outings, San Francisco, Calif.
- June 15, 22, 29 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- June 16—COZUMEL/AKUMAL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
- June 21 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, Calif.
- June 21 — ANDROS, BAHAMAS — 7 days, Fred Calhoun, Underwater Safaris, Boston, Mass.
- June 23 — BIMINI — 7 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- July 4, 11, 18, 25 — BONAIRE — 8 days, Lisind Int'l, New York, N.Y.
- July 4 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, Calif.
- July 5 — COZUMEL — 8 days, John Reseck, See & Sea Travel, San Francisco, Calif.
- July 8, 22 — TORTOLA, BVI — 13 days, Trimarine Boat Co. Ltd., St. Thomas, Virgin Islands
- July 8, 17, 25 — FREEPORT — 7 days, Skeet LaChance, Adv. Cruises, Ft. Lauderdale, Fla.
- July 10 — VIRGIN ISLANDS — 12 days, Sierra Club Outings, San Francisco, Calif.
- July 11—ROATAN, HONDURAS—8 days, Sunland Int'l Tours, Beverly Hills, Calif.
- July 12, 26 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- July 12 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- July 12 — BONAIRE — 9 days, Hank Ketels, See & Sea Travel, San Francisco, Calif.
- July 13 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- July 19 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, Calif.
- July 24 — MAUI-LANAI, HAWAII — 12 days, Sierra Club Outings, San Francisco, Calif.
- July 27 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- Aug. 1—VIRGIN GORDA, V.I.—12 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Aug. 1, 8, 15, 22, 29 — BONAIRE — 8 days, Lisind Int'l, New York, N.Y.
- Aug. 2, 23 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, Calif.
- Aug. 3, 17, 31 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Aug. 4 & 25—COZUMEL—8 days, Sunland Int'l Tours, Beverly Hills, Calif.

- Aug. 5 — KONA COAST, HAWAII — 10 days, Sierra Club Outings, San Francisco, Calif.
- Aug. 5, 19 — TORTOLA, BVI — 13 days, Trimarine Boat Co. Ltd., St. Thomas, Virgin Islands
- Aug. 8 — NASSAU — 14 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- Aug. 9 — COZUMEL — 8 days, See & Sea Travel, San Francisco, Calif.
- Aug. 16 — BONAIRE — 9 days, John Kelly, See & Sea Travel, San Francisco, Calif.
- Aug. 16, 30 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Aug. 16 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Aug. 17 — BAJA CALIFORNIA — 6 days, Sierra Club Outings, San Francisco, Calif.
- Aug. 17, 24, 31 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- Aug. 21 — HAWAII — 10 days, Arnold Stollar & Roy Damron, UNEXSO, Pompano Beach, Fla.
- Aug. 25 — NASSAU — 7 days, Skeet LaChance, Adventure Cruises, Ft. Lauderdale, Fla.
- Aug. 25 — CHINCHORRO REEF — 13 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Sept. 2, 16, 30 — TORTOLA, BVI — 13 days, Trimarine Boat Co. Ltd., St. Thomas, V.I.
- Sept. 5, 12, 19, 26 — BONAIRE — 8 days, Lisind Int'l, New York, N.Y.
- Sept. 5, 15 — BIMINI — 7 days, Adventure Cruise, Capt. Skeet LaChance, Ft. Lauderdale, Fla.
- Sept. 6 — COZUMEL — 8 days, See & Sea Travel, San Francisco, Calif.
- Sept. 6 — CAYMAN/ROATAN — 12 days, See & Sea Travel, San Francisco, Calif.
- Sept. 13 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Sept. 14 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Sept. 16 — CARTAGENA, COLOMBIA — 10 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Sept. 20 — BONAIRE — 9 days, See & Sea Travel, San Francisco, Calif.
- Sept. 20 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Sept. 26 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Sept. 28 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- Sept. 29 — FLORIDA KEYS, KEY LARGO — 7 days, Fred Calhoun's U/W Safaris, Boston, Mass.
- Sept. 29 — PALM BEACH SHORES — 5 days, Fred Calhoun's U/W Safaris, Boston, Mass.
- Oct. 3, 10, 17, 24, 31 — BONAIRE — 8 days, Lisind Int'l, New York, N.Y.
- Oct. 4, 25 — SAN ANDRES — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Oct. 4 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Oct. 5, 19 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Oct. 11 — AQABA, JORDAN — 15 days, John Clark, See & Sea Travel, San Francisco, Calif.
- Oct. 11 — COZUMEL — 8 days, See & Sea Travel, San Francisco, Calif.
- Oct. 14 — TORTOLA, BVI — 13 days, Trimarine Boat Co. Ltd., St. Thomas, Virgin Islands
- Oct. 18 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, Calif.
- Oct. 18 — BONAIRE — 9 days, See & Sea Travel, San Francisco, Calif.
- Oct. 19 — BELIZE — 7 days, Go Mexico, Inc., Minneapolis, Minn.
- Oct. 21 — AUSTRALIA/CORAL SEA — 17 days, Al Giddings, See & Sea Travel, San Francisco, Calif.
- Oct. 27 — CABO SAN LUCAS — 5 days, Sunland Int'l Tours, Beverly Hills, Calif.
- Nov. 1, 22 — ROATAN — 8 days, Go Mexico, Inc., Minneapolis, Minn.
- Nov. 2, 23 — COZUMEL — 8 days, Go Mexico, Inc., Minneapolis, Minn.



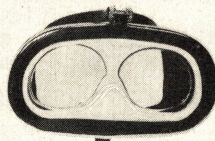
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THE NEW NAUI ITC

The instructor candidate of the 60's was rugged and hardy with years of diving experience. He (and it was nearly all men in those days) usually had a strong background with dive clubs and councils and competitive diving. His diving teaching experience was extensive, for he had taught many club members and friends how to visit the underwater world. There was not a vast array of equipment with multiple features from which to choose nor the sophistication of the elaborate devices employed in the diving of today. The greatest emphasis in diving was spearfishing and an underwater camera was hard to come by for the average diver. The candidate of the early NAUI courses was already competent in all areas of diving instruction and only attended an instructor course to prove it.

Times have changed. The candidate of today does not usually have extensive experience in diving and diving instruction, and a much greater knowledge of diving and diving equipment is required. The typical diving student of today is not the hearty, robust adventurous student of the 50's and 60's and therefore creates new philosophies and techniques of instruction. Diving instruction is fading as a hobby, for today the emphasis is on the professional diving instructor — an individual knowledgeable in numerous areas totally unaffected by his (or now her) earlier counterpart. This individual is not "an instructor ready to be tested", but rather a promising individual with excellent diving skills and knowledge and limited teaching experience — a diving instructor "in the rough."

The old Instructor Certification Course (ICC) was being revised each year to meet these new demands, but instructors previously certified by NAUI who were telling prospective candidates what to expect were not aware of the modified curriculum. The stress was being removed due to changes in educational philosophy, the subject areas were being updated, and the emphasis was shifted to teaching "How To Teach." In order to get everyone's attention, the name was changed to the NAUI Instructor Training Course (ITC). This has worked well, for now everyone, including NAUI instructors, asks, "what goes on at an ITC?"

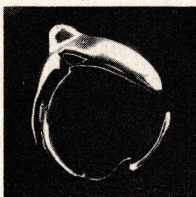
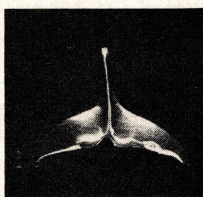
Much of the time at NAUI ICC's was used to evaluate physical skills. But now in order to attend a training course for certification as an instructor, a candidate needs to be certified as a NAUI assistant instructor. Nearly all physical skills are evaluated in the assistant instructor program providing more time during the training course to develop methods and techniques of instruction. Assistant instructors are also required to pass a comprehensive written exam to assure sufficient knowledge to become instructor candidates.



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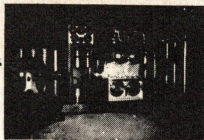


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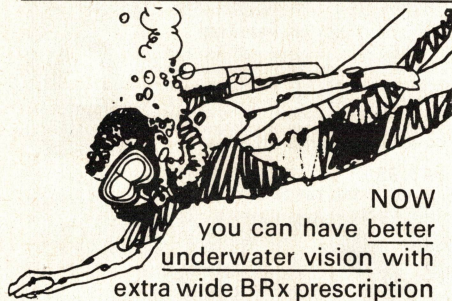
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The schedule varies due to logistics, but the curriculum is standard. Essentially, the candidates will be involved in teaching every facet of diving from skin diving through sport scuba diving (an open water dive program after basic scuba). Numerous open water dives are made during the ITC. The candidates learn to develop their own lessons for diving instruction. They spend many hours in practical teaching during the course. There is a heavy emphasis on diving safety with attention given to first aid, lifesaving, emergency procedures and cardio-pulmonary resuscitation. In order to make the new instructor effective in the field, much time is spent on the business of diving instruction. Today's instructor needs to be familiar with sales, service and maintenance. And these among others make up numerous excellent knowledge expanding presentations during the program.

Attendees are evaluated first on a qualification dive in open water where the staff conducts a training dive in the most exemplary manner, then in a number of in-water practical teaching situations and finally in a problem solving exercise in open water. During problem solving, the staff, posing as basic diving students, present typical student problems which the candidates must recognize and cope with effectively. Additionally, candidates are evaluated on the complete rescue of a scuba diver and practical teaching in the classroom. A written examination is administered near the end of the program to test knowledge presented throughout the course.

Tradition is not dead though, for each candidate still demonstrates control of self and equipment in the NAUI bailout — holding all gear in the hands and jumping into the water with the air turned off. The traditional banquet celebration at the close of the course with light-hearted awards, skits and presentations is still very much a part of NAUI Instructor Courses.

The key word about NAUI Instructor Training Courses is "involvement". Candidates are involved in teaching, discussions, case study, problem solving, skill practice and more. Candidates and staff alike share backgrounds, knowledge and experience. For this reason residency at the course site is mandatory.

The "Espirit de Corps" and loyalty formed during an ITC is incredible. It is an understatement to call it an unforgettable experience. It is not possible to describe what happens at a NAUI ITC: you have to experience it for yourself. If you would like more information on becoming a NAUI Instructor, write to NAUI Headquarters, 22809 Barton Road, Colton, CA 92324. You will receive the NAUI Blue Book for Instructor Courses outlining the requirements and preparation necessary.

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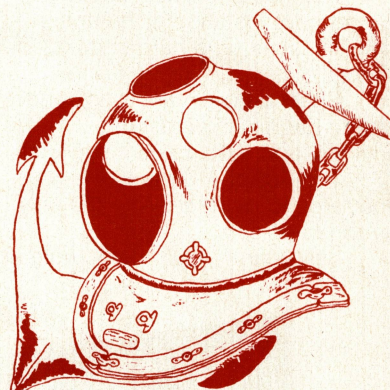
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1975 is the year of the hard hat deep sea diver. More commercial and industrial divers are needed now than ever before. But with military diver training considered inadequate by most commercial companies, where will the new divers come from? It's a safe bet that the biggest percentage of them will come from Coastal School of Deep Sea Diving in Oakland, California, which celebrated its 25th anniversary this year.

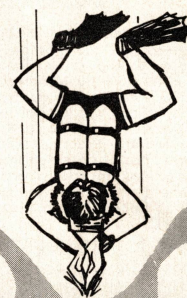
Located on a navigable estuary of San Francisco Bay (the world's largest natural harbor and a major global diving center), the school has trained over 3100 divers, including an estimated half of all U.S. commercial divers. The oldest and largest school of its kind in the world,



Coastal's number one position is no accident. It is the culmination of a lifetime of tireless effort by one man — Alfred A. Mikalow. Long recognized as one of the nation's leading authorities on commercial diver training, Al worked his way up the hard way, beginning his career as a Navy diver during World War II. After the war, he spent years as a freelance diver working out of Santa Barbara on projects from Baja California to the Ivory Coast of Africa. After a stint with Pacific Towboat and Salvage in Santa Barbara, Mikalow worked in the Persian Gulf for Arabian American Oil Company, returning to California to become successor to the Sparling School of Diving, which he moved to San Francisco from Wilmington (L.A. harbor). Continued growth motivated relocating to larger space in Oakland on the estuary, and in 1969 he settled in his present location and began developing the extensive facilities for today's training.

Al's early experience running a commercial diving firm convinced him of the need for a comprehensive professional diver training school to meet the expanding challenges of all types of industrial diving. Most hard-hat divers at that time either had military training or were being trained on the job under a journeyman/apprentice system. "A commercial diving pro," Mikalow says,

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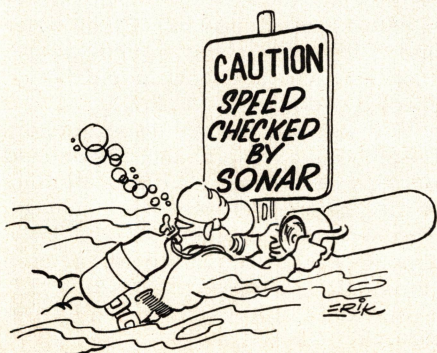
"has to do many jobs which would be handled by different specialists if the jobs were not underwater." Carpentry, drafting, blueprint reading, steel working and welding are all skills needed, in addition to knowledge of oceanography, familiarity with numerous types of diving equipment and tools, underwater photography, demolition and explosives.

Coastal's 11½ week, 427 hour course, includes over 250 hours of on-the-job experience. Mikalow's emphasis on practical hands-on training has led to the development of a million-dollar facility, including a 125 ton ship, 2-man sub, free ascent tower for lock in-lock out systems, a 23,000 gallon indoor tank, submerged wreck, five types of recompression chambers and more. Over a quarter of a million dollars is invested in diving equipment, including 20 different types of helmets. "We're probably a little heavy in the equipment department but a diver is expected to be able to use all equipment with little or no familiarization time," says Mikalow. Classroom facilities are currently being further expanded with completion of a 3000 square foot building to house the school workshops and equipment of Divers Supply Company, a subsidiary.

Over the years, Mikalow has pioneered a number of firsts at Coastal School. He has created the diver training guidelines used by both federal and state governments; he developed new gas diving tables; he was the first to use videotapes of student performances in commercial diver training. The school is recommended by the army and the navy.

The expanding role of the commercial diver in today's energy-hungry world has placed a premium on the skills that Coastal School teaches. These days, a graduate can virtually write his own ticket, and salaries for top hard-hat divers can be several hundred dollars a day for trained men. From the oil fields on the Persian Gulf to industrial work in the China Sea, to scientific exploration in the Mediterranean to abalone diving off the coast of California, Coastal graduates are in world-wide demand.

When asked to sum up his philosophy of diver training after nearly 25 years of experience, Mikalow smiled and said, "It's simple, it's not how deep you can go that counts, but what you can do when you get there!"



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Dr. Merrill P. Spencer, director and president of the Institute of Applied Physiology and Medicine of Seattle, Washington, was presented with the Leonard Greenstone Diving Safety Award at IQ6 in San Diego. The award, a beautiful metal sculpture mounted on jade, plus a check for \$500, is presented to individuals who make outstanding contributions to diving safety.

Dr. Spencer's achievements are in diving physiology research. He was director of the Virginia Mason Research Center for eight years, is active in the Undersea Medical Society, serves on the board of advisors at Bellevue Community College Diving Program, has written over 100 nationally published articles and has served on numerous diving medical committees and panels. He is greatly responsible for recent research of blood bubbles for development of improved decompression tables, and his techniques for non-symptomatic detection of decompression problems represent a major breakthrough in diving physiology.

The Greenstone Award is a perpetual award and may be presented annually. Nominations for the award should be sent to: Greenstone Safety Award, NAUI Headquarters, 22809 Barton Road, Colton, California 92324. A brochure with more detailed information is also available from NAUI headquarters.

PADI TANK PROGRAM

The Professional Association of Diving Instructors considers tank inspection a very important safety precaution and has started a tank inspection and maintenance program. Scuba tanks that have been hydrostatically tested are generally considered safe for five years from test date. However, a tank can be ruined within three months if sea water seeps inside. Fresh water can also ruin a tank, but the chemical reaction is slower. Soon after water enters a tank, it combines with oxygen, rust has its start. High pressure air in a badly rusted tank can produce a large and lethal explosion.

The most effective means of preventing rust is by visual inspection. If rust is present, it should be removed and the corrosive action stopped. The average tank should be inspected at least once a year. Rental or heavily used tanks should be inspected once every three months. A tank that is used constantly in salt water and is filled anywhere around salt air, such as a charter boat, should be inspected every six months.

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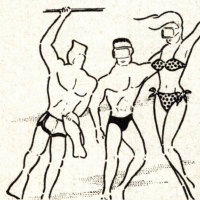
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YMCA SCUBA CONVENTION

The Metro Chicago YMCA Scuba Instructor's Committee and the Metro Chicago YMCA Skin & Scuba Diving Council will serve as co-hosts for the National YMCA Scuba Convention to be held at the Sheraton Chicago Hotel on May 1-2, 1975.

The format of the convention is designed to allow YMCA Scuba Instructors and divers to meet in small special work groups. The work groups will report their findings and recommendations to the general convention for implementation. In short, the convention will allow for personal involvement.

Some of the anticipated work group sessions are: audio-visual material development, organizing and maintaining a dive club and council, specialty courses, instructor institute standards, program communication improvement, test development, and instructor manual development. There are two lines on the convention registration form that will allow both convention attendees, as well as non-attendees, to list two topics they would like to have considered.

Another highpoint of the convention is the fact that the place and dates were chosen to allow instructors and divers to take advantage of Our World Underwater. Our World Underwater, sponsored by The Metro Chicago YMCA Skin & Scuba Diving Council, has developed into one of the outstanding diving programs and film festivals. Our World Underwater will be held on May 3rd & 4th at the Sheraton-Chicago Hotel.

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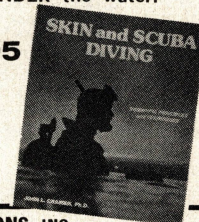
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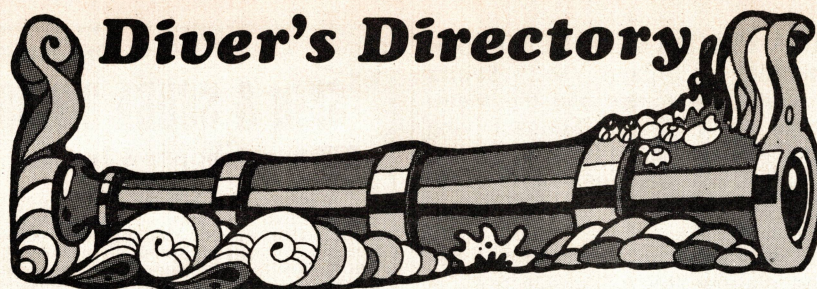
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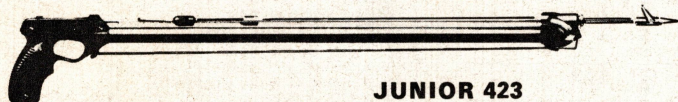
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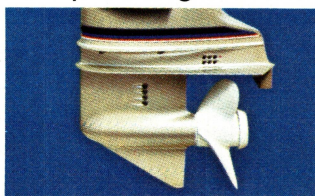
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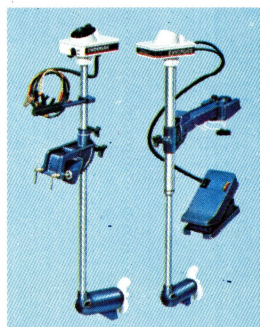
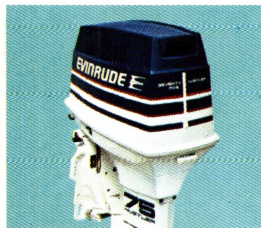
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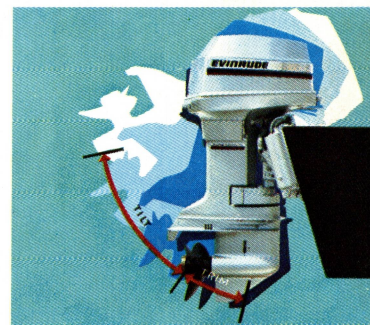
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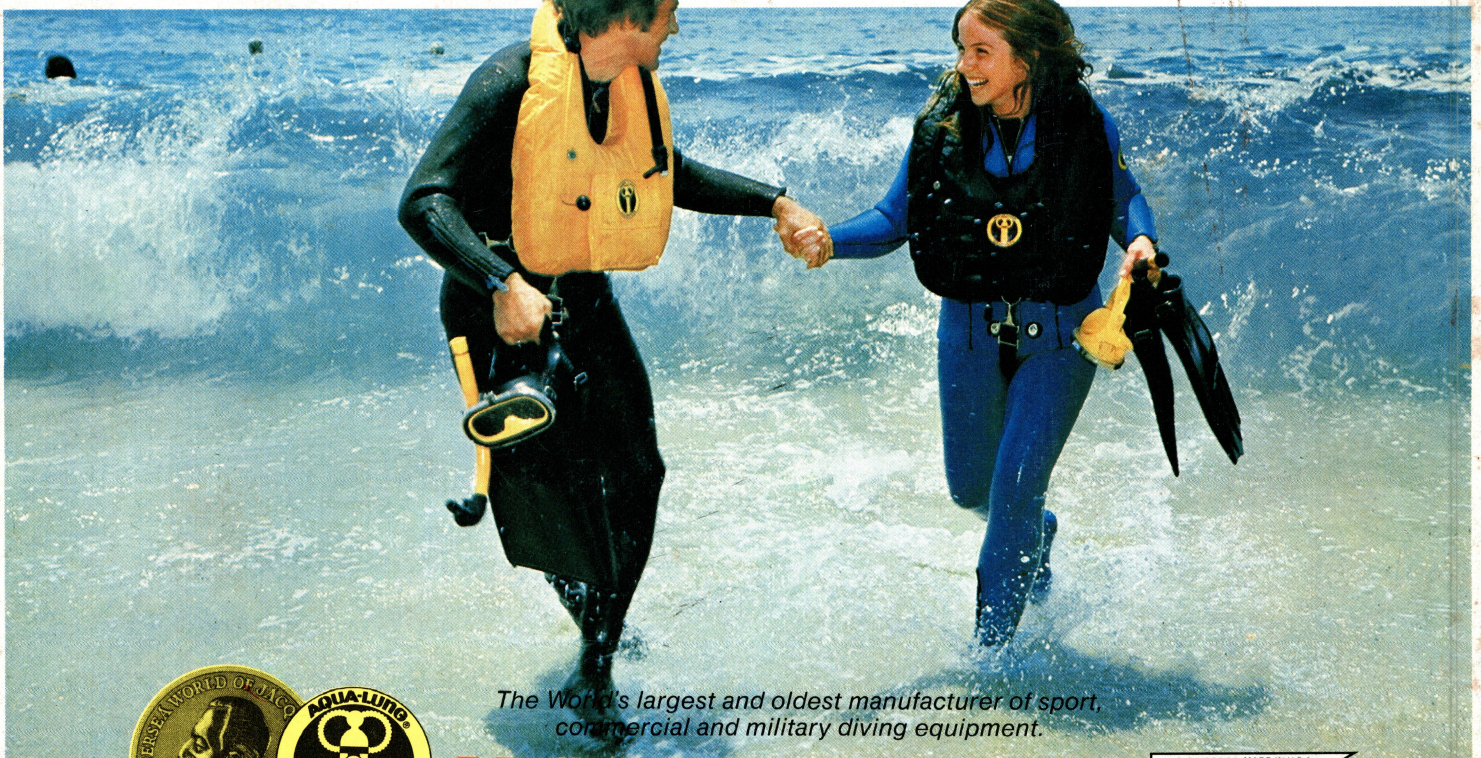
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